JANUARY 5, 1953

STEEL

The Weekly Magazine
of Metalworking

METALWORKING
YEARBOOK ISSUE

A PROGRAM FOR MANAGEMENT IN 1953

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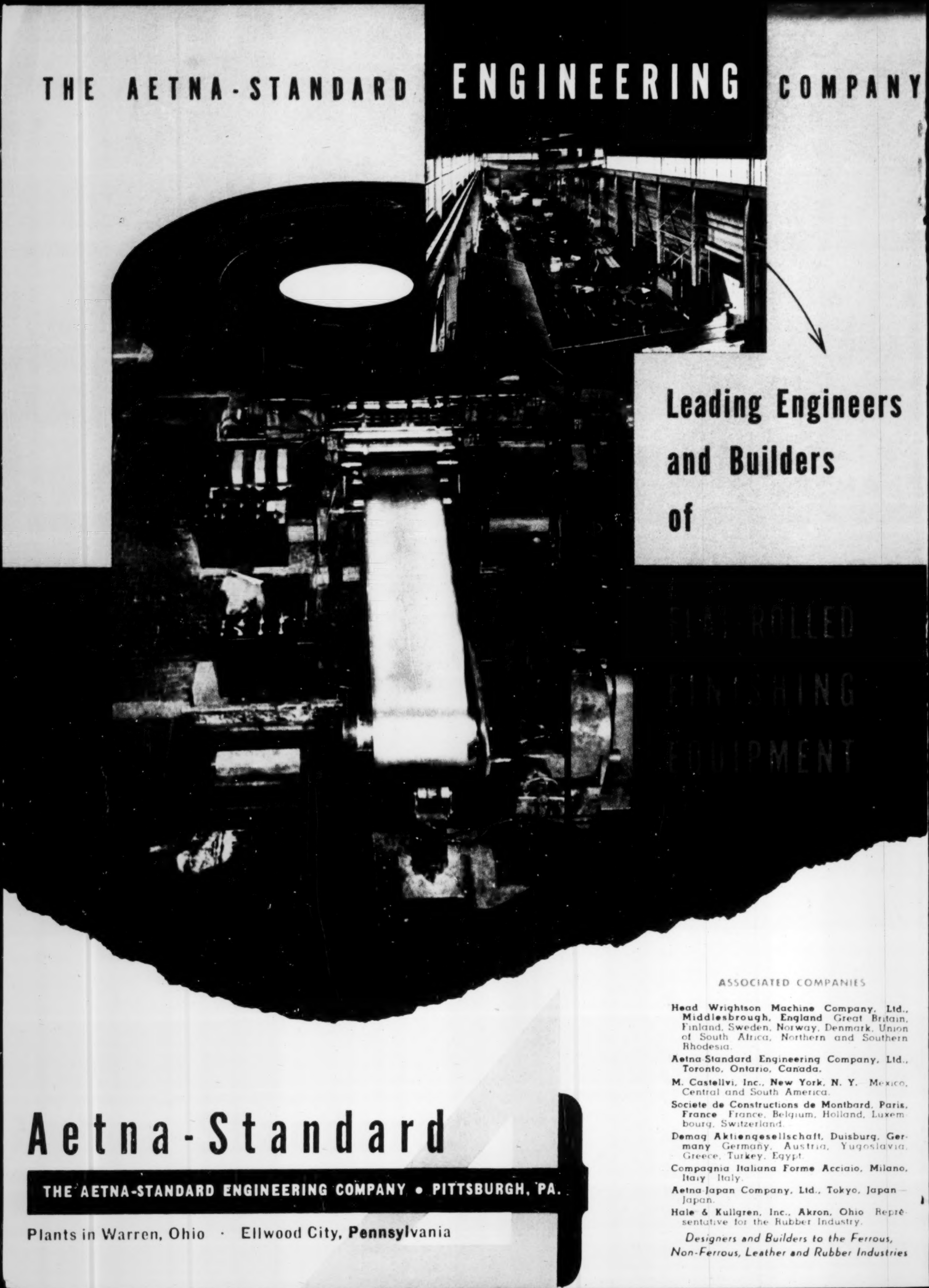

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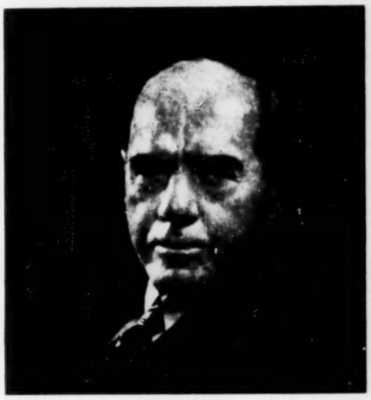
Reprinted from the Bethlehem Review, December, 1952

The Road Ahead



E. G. Grace

The year 1952, now drawing to a close, has been one of crisis and decision for the nation and for the steel industry.

Last month's elections confirmed which way we have turned. They marked the end of an era and the beginning of a new one which it is reasonable to believe holds forth brighter hopes for all of us.

No sensible person thinks that the decision of November 4 provides an automatic solution for all of our problems and difficulties. Some of these difficulties stem from our long inflationary spree. Putting an end to that spree and regaining solid economic health may impose some stresses and strains. It will call for self-discipline and broad understanding in all walks of life.

This does not imply any turning back of the clock, nor any retreat from the high standard of living we have managed to achieve in the face of great odds.

We must concede, however, that there are serious obstacles to be overcome. We must stop inflation. We must reduce taxes. We must balance our budget.

We live in uncertain times and much that we must do is determined by the actions of powers hostile to the free world. Regardless of whether our problems are internal, external, or a combination of both, we now have a chance to face up to them in more effective ways.

Beginning a Constructive Era

Industry now can reasonably expect that it can conduct business in an atmosphere of understanding and mutual cooperation. Our energies can properly be expended on the job of production and distribution, and not dissipated through fighting a rear-guard action to prevent being absorbed by the Federal octopus. We are launched on an era of constructive progress. The real progressives of our time are those who have faith in a free economy and a free state.

Here at Bethlehem, we have that faith. We enter the new era with our physical properties intact and with our competitive position greatly strengthened. Our plants have been expanded and our expansion has been to an integrated plan. We are ready for and confident of our place in that freer future.

New-Found Unity

At the beginning of this new era the hope must be that the conflicts engendered in the old will give way to a new spirit of cooperation, fair play and mutual endeavor. The United States emerged from a hard-fought election contest as a united nation perhaps more united than it has been since we closed ranks after Pearl Harbor.

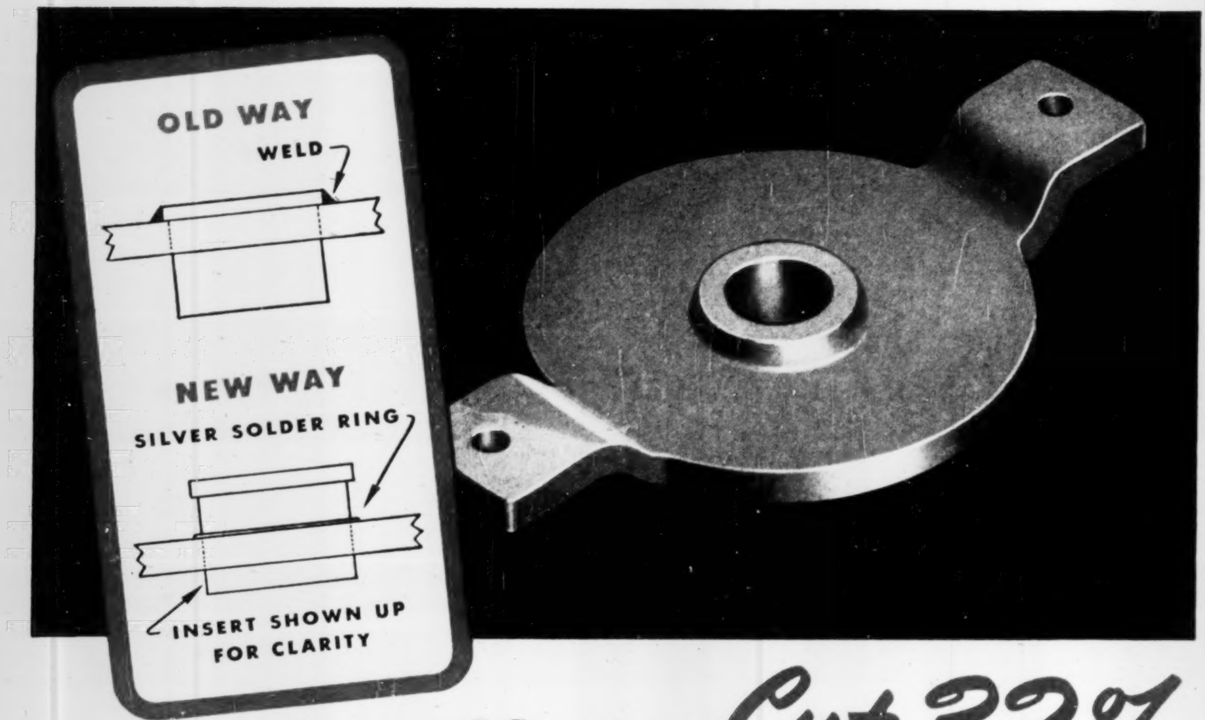
Let us take full advantage of that new-found unity. Let management, employees and their authorized representatives, together with all other elements of the nation, get on with the job of making an ever-growing and sounder America.

E G Grace

CHAIRMAN, BETHLEHEM STEEL COMPANY

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.



Assembly Cost *Cut 32%* with TOCCO* Induction Brazing

Now's the time to balance YOUR production budget

This assembly may bear no resemblance to your product, but its case is typical of the savings accomplished by Induction Heating of metal parts of all sizes and shapes.

Formerly the Norris Thermador Corporation used arc welding to join the bushing and clamp shown above. In an effort to reduce costs TOCCO Induction Heating was brought into the production picture with the following results:

OLD METHOD (Arc Welding)	
Material (rod)	$ 4.56 per M parts
Labor	20.63 per M parts
Overhead	21.25 per M parts
Total Cost Old Method	$46.44 per M parts

NEW METHOD (TOCCO Induction Brazing)	
Material (solder and flux)	$13.83 per M parts
Labor	8.82 per M parts
Overhead	9.08 per M parts
Total Cost TOCCO Method	$31.73 per M parts

TOCCO Engineers are glad to survey your operations for similar cost-cutting results—no obligation, of course.

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Please send copy of "Typical Results of TOCCO Induction Brazing and Soldering."

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Company__________
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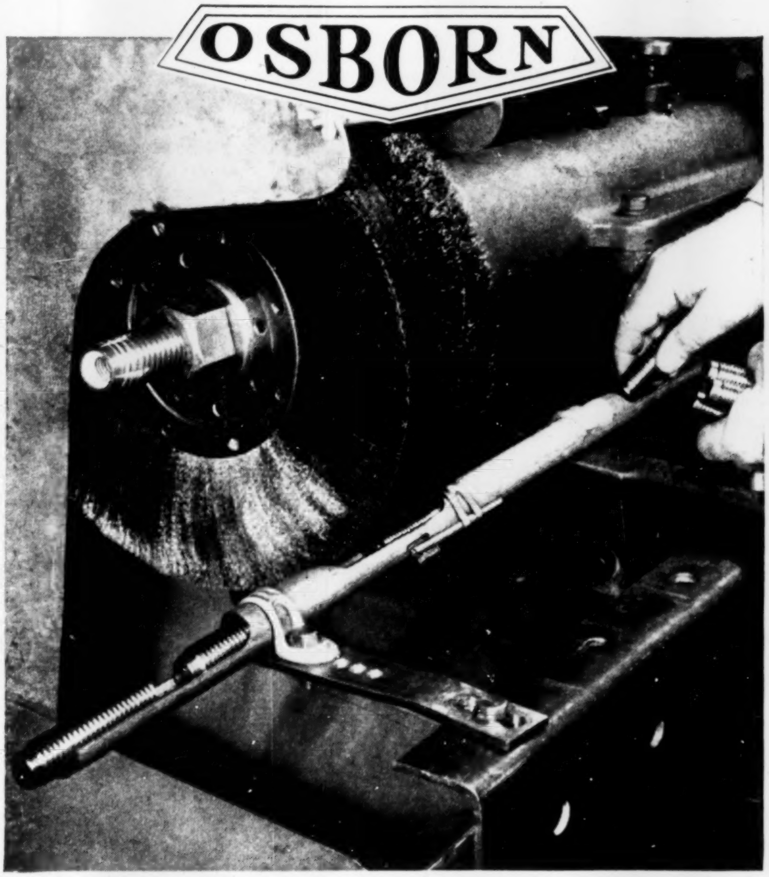
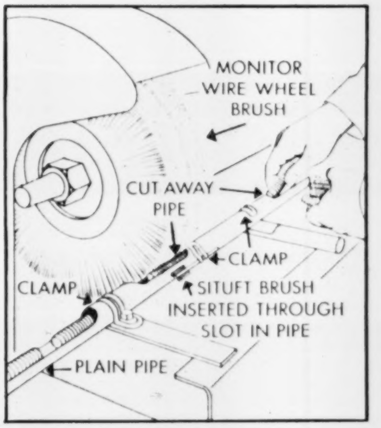
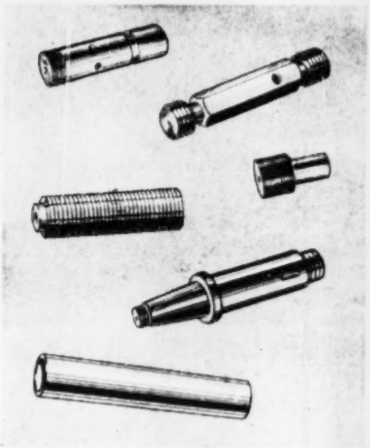
OSBORN

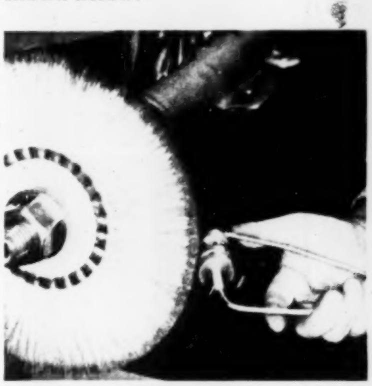




THE FIXTURE. This sketch shows how to make pipe fixture for deburring and polishing small parts, threaded or smooth. Can be made of steel, fiber or plastic tubing.



TYPICAL PARTS. Set screws, pins, pieces of tubing and other parts such as these can be cleaned and finished in the pipe fixture or in the forceps shown below.



ANOTHER SIMPLE APPROACH. For small parts such as bushings, a simple forcep fixture can be devised to hold parts for power brushing. This one is made of wire.

How to find an 800% production increase in a piece of pipe

You can save manpower and money in countless ways when you tap the idea resources of power brushing. For example:

It took 18 seconds to clean the threads of the 2½ x ¾-inch set screws shown above. Time was cut to 2 seconds with Osborn Power Brushing by devising the simple pipe fixture shown. The operator feeds the screws in one end of the pipe and an Osborn brush makes contact with the work at a slot cut in the pipe, spinning and cleaning the threads uniformly. A little stationary wire brush, inserted as shown through the pipe, controls rotation and traverse of the work.

Have your **O**sborn **B**rushing **A**nalyst help you develop and apply output-increasing ideas to *your* cleaning and finishing operations. Call now or write *The Osborn Manufacturing Company, Dept. G-1, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

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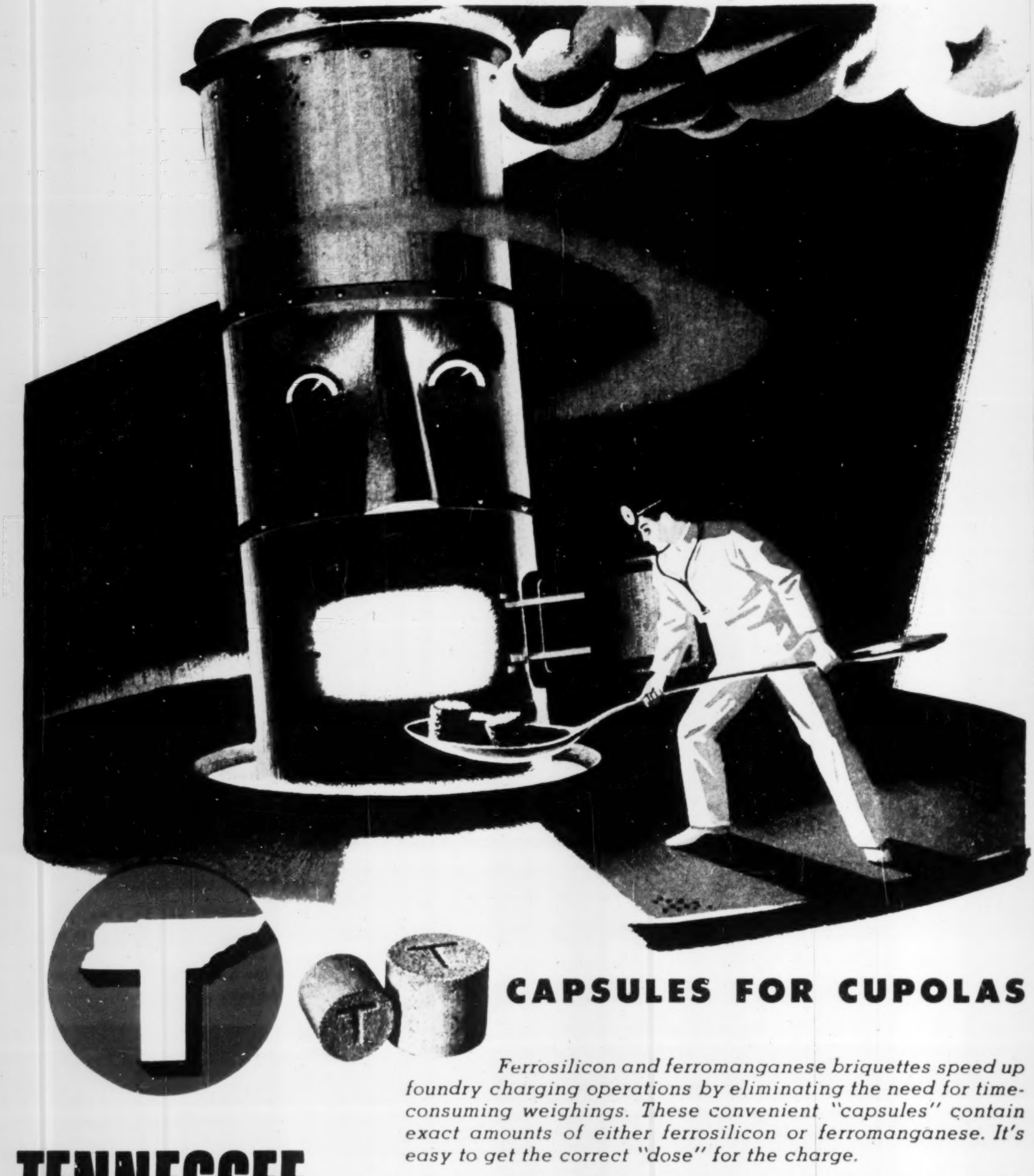

CAPSULES FOR CUPOLAS

Ferrosilicon and ferromanganese briquettes speed up foundry charging operations by eliminating the need for time-consuming weighings. These convenient "capsules" contain exact amounts of either ferrosilicon or ferromanganese. It's easy to get the correct "dose" for the charge.

Ferrosilicon is available in lump, sized or powder form as well. And Tennessee Products also makes low phosphorus pig iron and high grade malleable pig iron for the metal industries.

For complete details, write Tennessee Products & Chemical Corp., First American National Bank Building, Nashville, Tenn.

TENNESSEE
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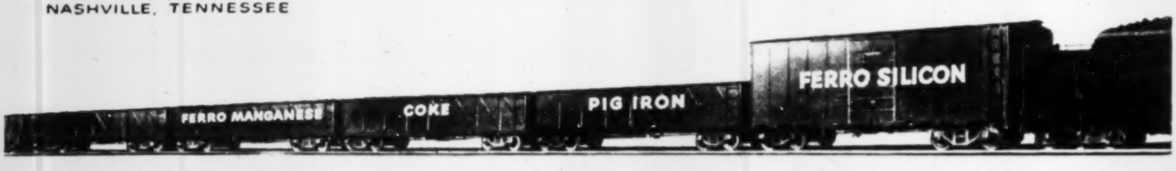
NASHVILLE, TENNESSEE



STEEL
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VOL. 132 No. 1 JANUARY 5, 1953

1953 METALWORKING YEARBOOK ISSUE

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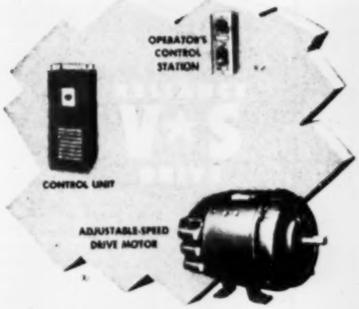

Reliance V★S Drive, 3/4 to 3 horsepower, has proved especially profitable in the operation of small machines. Write for Bulletin D-2101. For detailed information about larger V★S Drives to 300 horsepower, specify Bulletin D-2311.

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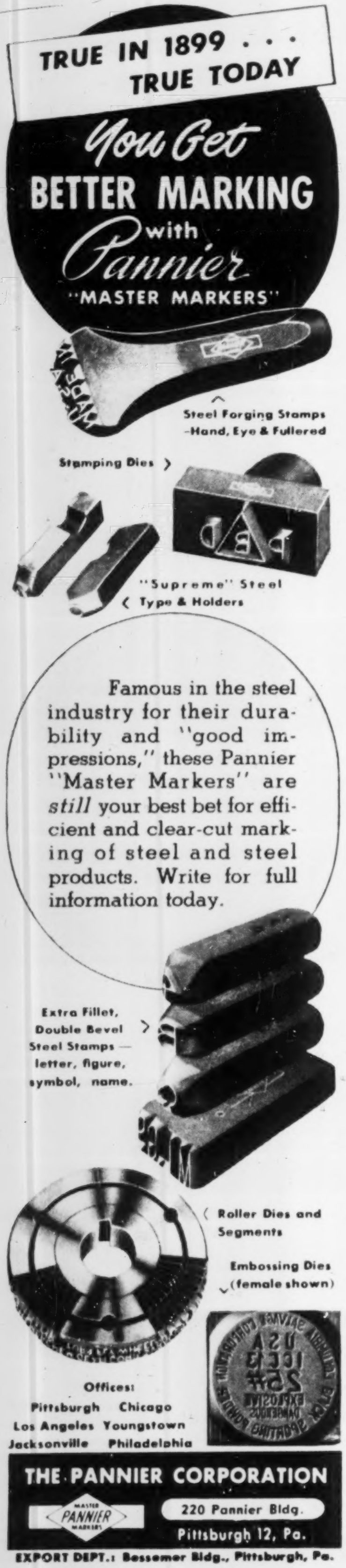

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Behind the Scenes . . .

This Is It

Yes, here it is. This is STEEL's 1953 Yearbook issue that we've been mentioning off and on for a month or so. You're now reading on page six in our pride and joy. We can't even guess how many barrels of sweat went into getting the information together and then wrapping it up in its present form. We do know, though, that in addition to the editors, the business, advertising, promotion and press departments all kicked in to make this issue the best we've ever had.

Here are some bits of information to help you picture what goes into a special operation like this. Over 100,000 pounds of paper were used. That's more than two carloads. More than 1800 pounds of black ink and 600 pounds of color went on the paper. About 350 pounds of glue went into the operation. More than 3 miles of wire went into staples for the issue.

About 1.5 million press impressions were used to get the words and pictures on the pages. The paper comes in sheets 35 inches long and if all these sheets used for this issue were laid end to end they would stretch out into a nice shiny — but slippery — white sidewalk from Cleveland to Philadelphia.

If all the individual magazines of this Yearbook issue were piled up one on top of the other, they would reach as high as would the Empire State building plus Niagara Falls plus seven Greyhound buses (end to end) and minus Joe Louis.

The Eighth Wonder

We've heard of versatility but this tops them all. We have an official news release describing a pair of scissors with 18 separate and "indispensable" items built in. They include button-hole scissors, cigar cutter, wire cutter, ruler, screw driver, box lid opener, glass cutter and tack hammer — to mention but a few. Oh, yes — there's also the pair of regular scissors.

The item should prove indispensable to grandma who can, without loosening the grip on her button-hole scissors, snip off the end of her cigar.

One feature which will prove more indispensable than all the rest, however, is the pin-sized piece of glass set in the shank. Closer scrutiny will reveal that this is the rival to television, for by looking in here you can see five pictures, all titled. They include such famous sights as Grant's Tomb, Rockefeller Center, Broadway at Night, etc.

We suspect that demand will lead to a special businessmen's model, with a minor change in the selection of views. If you're interested, by the way, we can tell you how to get one (the standard model, that is).

Favorites

If we can use the requests for additional information and reprints as a guide (and we think we can) the most popular item STEEL presented to its readers in 1952 is the "Guide for Selecting Tool Steels and Carbides" which appears in the June 16 issue.

Others at the top of your list are "New Method Makes Stainless Extrusion Practical" in the June 2 issue; "Metals in the Jetomic Age" in the Oct. 13 issue and the Blast Furnace Practice series which is now available in book form.

This year no requests were received for reprints of Behind the Scenes. This surpasses our own record which we set in 1951. Orchids to us.

Puzzle Corner

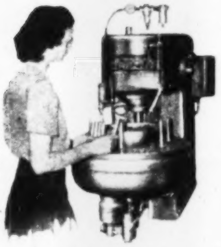
The puzzle which seemed to be the most controversial last year is the one which appears in the issue of Nov. 17. You probably remember it. It's the one on pouring some wine and some water back and forth between two containers.

This time we can't list the solvers of our last problem. Since this is the big issue, it's going to press long before the answers have started to come in.

Here's the new one. Al and Sam take their trotting horse out to the track and time it. It makes 9.52 seconds better time following the inner instead of the outer circumference of a circular race track 50 feet wide. What's the horse's speed?

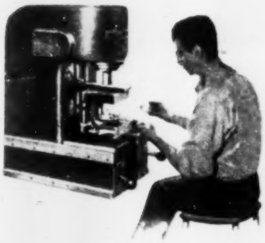
Shrdlu

(Metalworking Outlook—Page 103)

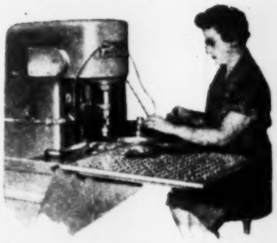


Assembly speed is doubled using Multipress to crimp a small brass contact to pen-type flashlight cases

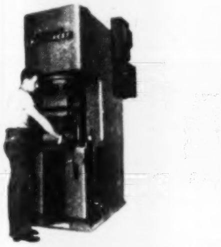
20,000 mop clamps a day is cost-cutting speed of 35-ton Multipress using roll-feed and 4-stage dies



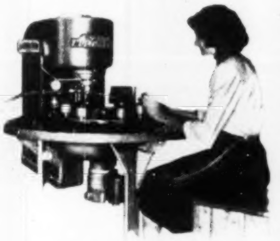
Dies stay sharp twice as long when Multipress is used in trimming flash and gate from die castings



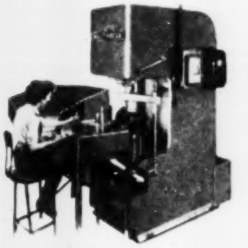
Scrap losses drop sharply as Multipress doubles staking speed on high precision voting-machine counter wheel



Six hours saved on every 100 finished units as famous electric cleaner plant adopts Multipress to clean cast housings

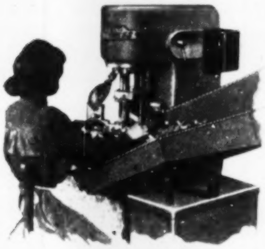


Output is boosted by 100% by famous toy train maker, staking 6-part assembly together with Multipress

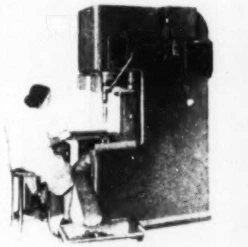


At twice the speed of previous method, Multipress assembles bolts on electrical insulator holders

1600-per-hour rate slashes production costs when 4-ton Multipress is used to broach serrations on small cams



No down-time for repairs in 7 years for Multipress used to bend tabs and arch locks on steel clamps at high speed



Speed doubled on delicate job of drawing thin phosphor-bronze tubes used in forming sensitive thermostat bellows

Less operator fatigue noted as Multipress Midget assembles two check valves to main valves at 450 per-hour

In only four stages, Multipress deep-draws a precision ordnance part formerly requiring 8 draws

Speaking of Trends... MULTIPRESS®

Thousands of actual Multipress installations prove that its smooth, oil-hydraulic power control is the surest answer to growing demands for faster production, better quality control, quicker tool changing, safer operation, and lower scrap losses.

It offers complete, stepless adjustability of ram speed, pressure and stroke length. Manual and automatic models in a complete range of sizes and capacities up to 50 tons.

Pressures build up instantly after the ram contacts the work. There's no hammer-blow impact on either the work or tooling.

With Multipress Index Table Feeds, parts or assemblies can be loaded on fixtures at several points around the table dial — by two or more operators, if necessary. The fixtures index automatically under the press ram at speeds up to 70 per minute.

Automatic time delay, for ram dwell or hold-down needs, is easily provided with Multipress.

In fact, Multipress offers such a wide choice of valving, ram controls, auxiliary feeds, operating accessories, and tooling attachments — all easily interlocked with the press ram action — that it has become one of industry's most versatile tools for low-cost production and assembly.

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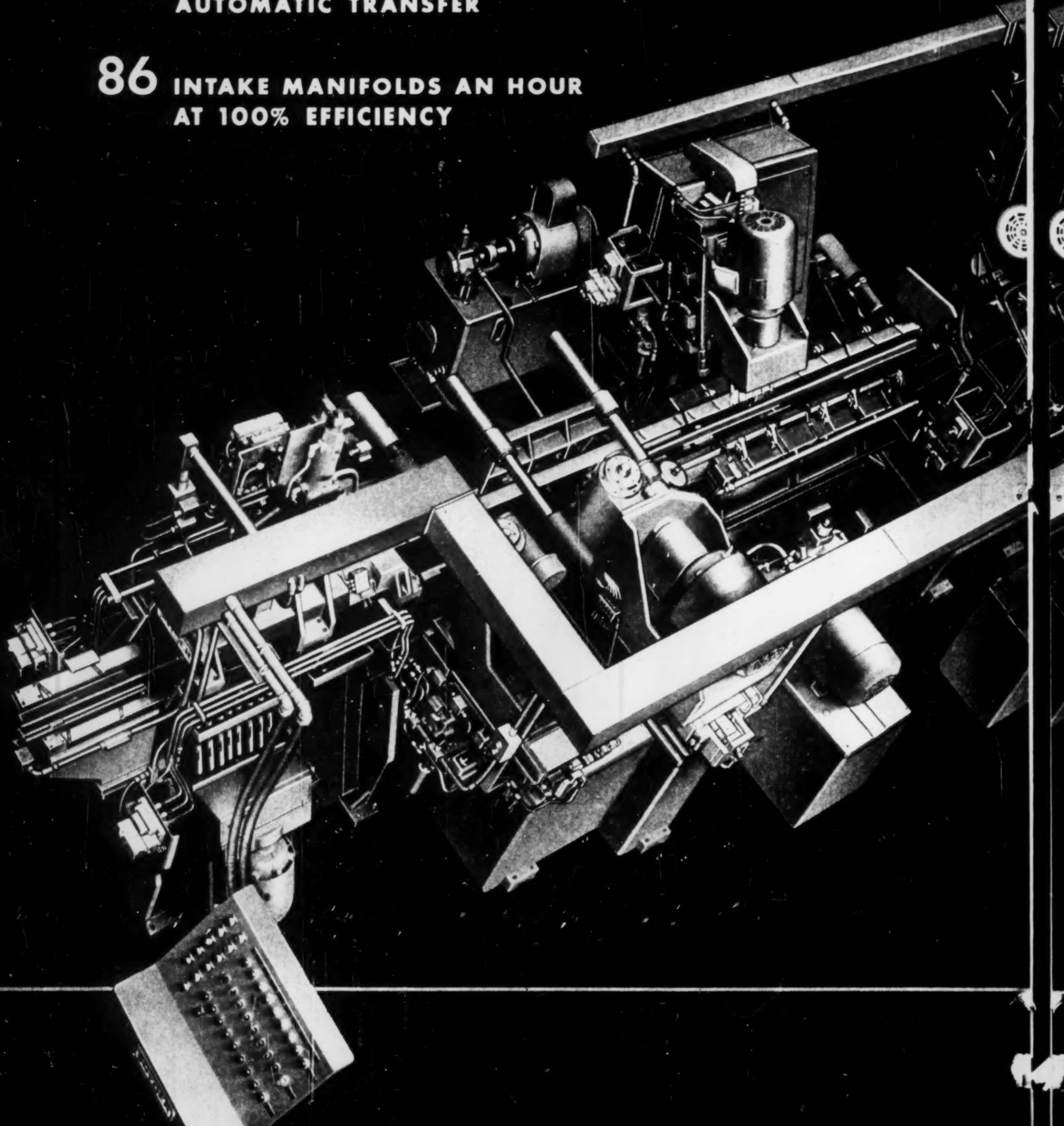

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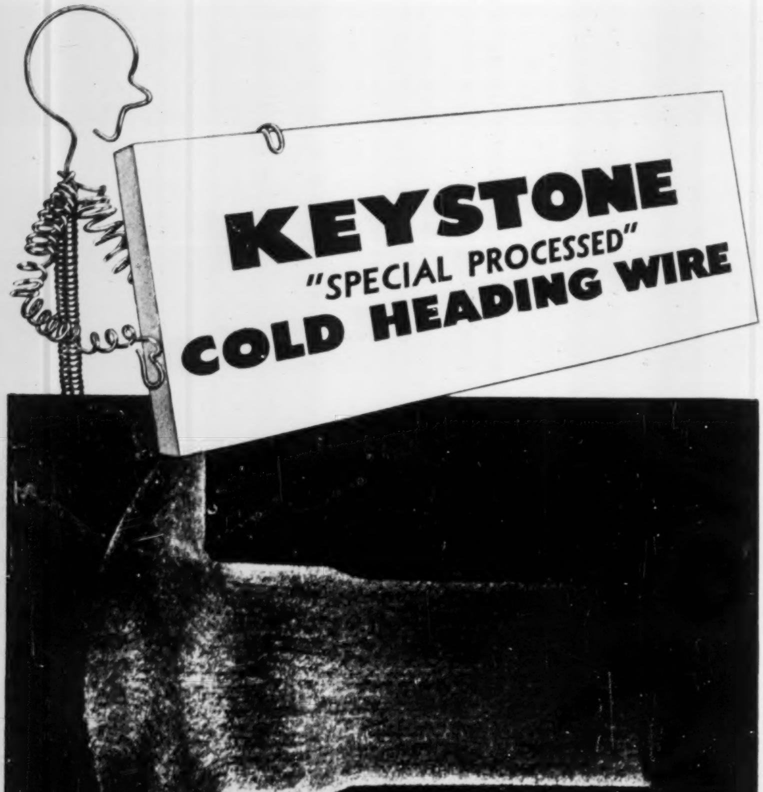
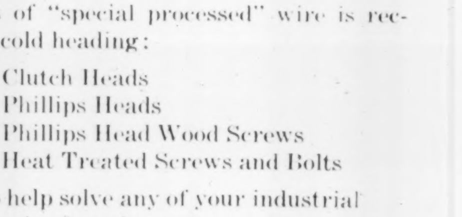


UNIFORM, strength-giving, grain flow characteristics are clearly indicated in the above macrograph of a carriage bolt made from Keystone "Special Processed" C1038 Cold Heading Wire. The long, continuous fibres through shank and head give the "inside story" of efficient cold heading which results in longer die life, increased production and a better finished product.

The following analysis of "special processed" wire is recommended for difficult cold heading:

C1006 - C1012 for Clutch Heads
C1006 - C1022 for Phillips Heads
C1108 - C1109 for Phillips Head Wood Screws
C1035 - C1038 for Heat Treated Screws and Bolts

Keystone is prepared to help solve any of your industrial wire problems. Your inquiry is welcomed.



Keystone Steel & Wire Company
PEORIA 7, ILLINOIS

LETTERS
TO THE EDITORS

Ring in the New

Merry Christmas, holiday greetings and best wishes for the coming year. I always enjoy your column, as well as all of STEEL.

Ralph Pappenheimer
Specialty Device Co.
Cincinnati

Key to Information

Would you kindly send me indexes for the issues of STEEL, beginning Jan. 1, 1951. The wealth of information in your magazines would be readily available with this aid.

Lane Jonap
570 East 101 St.
Cleveland

- *Sent.—ED.*

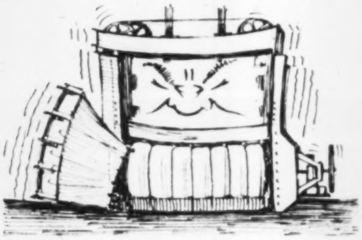
Capacity Copy Called For

We have a client for whom we are compiling certain information relative to electric furnaces. We would like to secure a copy of your article "Arc Furnace Capacity" (July 30, 1951, p. 74).

Wayne W. Baskin
Bureau of Foreign & Domestic Commerce
National Production Authority
Phoenix, Ariz.

- *Sent.—ED.*

Convert a Cotton Press?



While out in Oklahoma, an idea occurred to me which might be helpful in reclaiming a lot of scrap for the steel industry.

Cotton gins use a hydraulic press for baling processed cotton after it is ginned. I don't remember just how much the average hydraulic pressure is on the ram of an average cotton press, but, I believe it is around 1500 to 2000 pounds. Further, some of these cotton gins are idle for seven or eight months of the year. They could be put to use in pressing scrapped auto bodies and similar light scrap.

The press box of the cotton balers would have to be smaller and stronger, and made of steel, of course. Perhaps some auxiliary equipment could be worked up by cotton gin manufacturers.

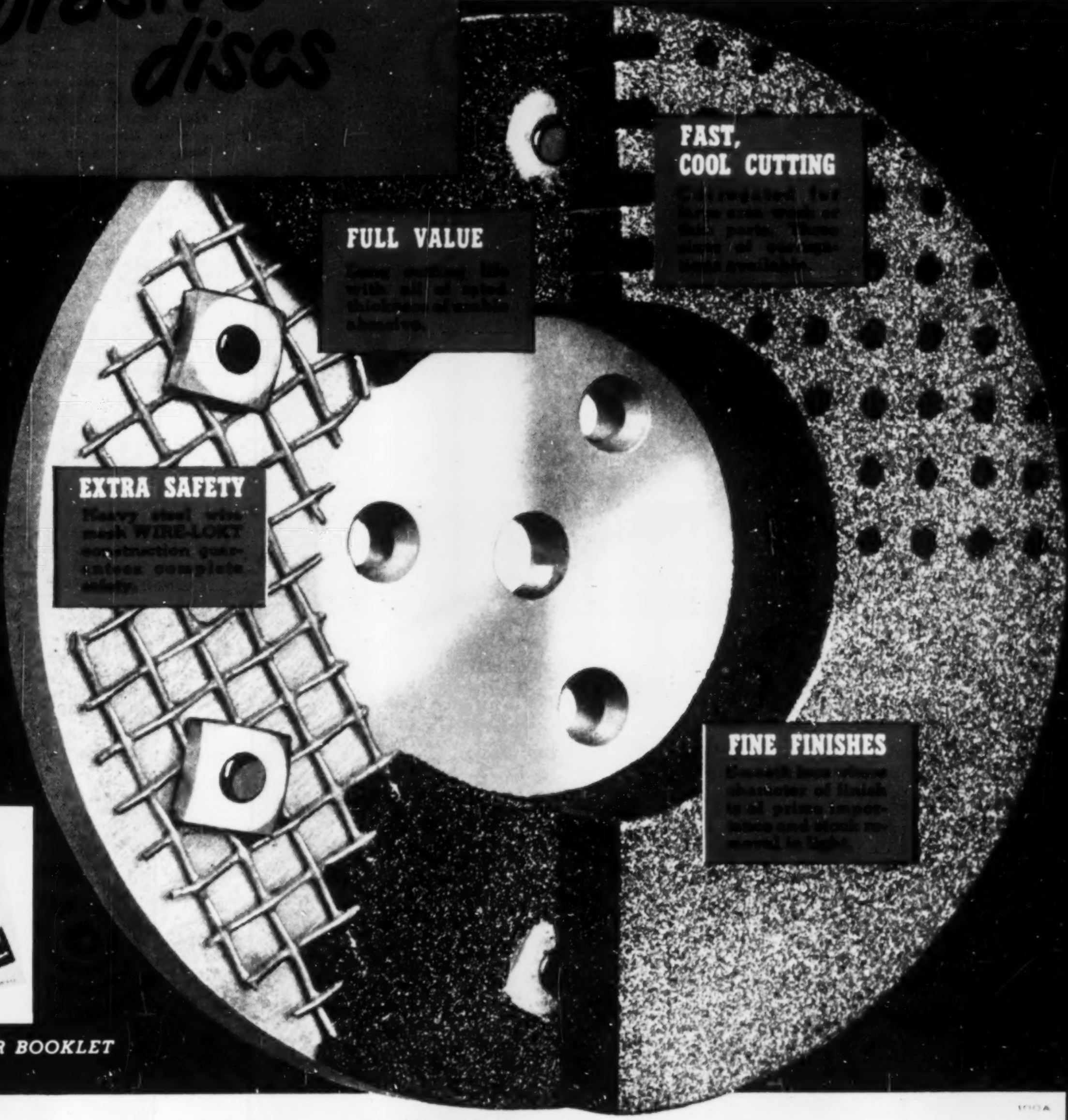
If the mechanics of the adaptation could be worked out, the economics would certainly support the activity. Since those large cotton raising districts are a long way from the steelmaking furnaces and, in many cases, are covered with abandoned autos, this would be a

Continued on following page

GARDNER

abrasive discs

4 ways to improve operation of any disc grinder



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FULL VALUE

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Heavy steel wire mesh WIRE-LOKT construction guarantees complete safety.

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Smooth [illegible] where character of finish is of prime importance and stock removal is light.

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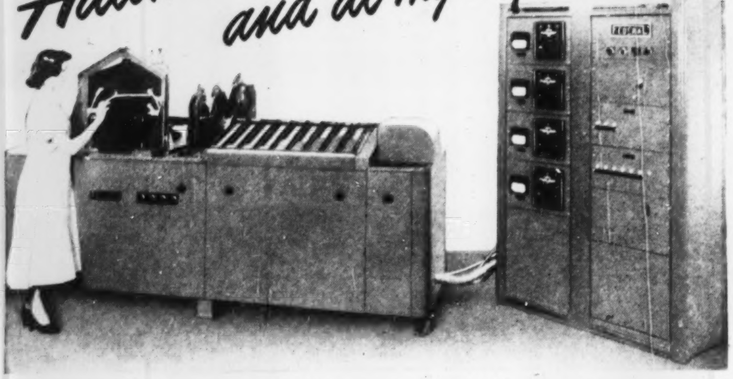
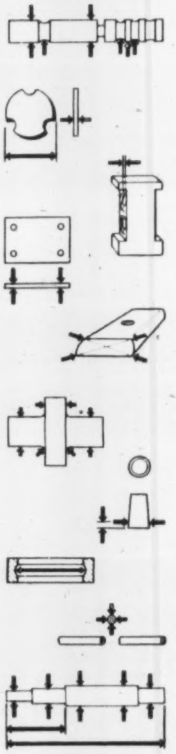


At a speed of 3,000 plus per hour this conveyor-fed multi-inspection gage measures and sorts piston pins for hardness, triangular out-of-round, taper and diameter along the full length of the workpiece. The pins are automatically sorted into ten disposal units: out-of-round, tolerance .00005"; taper, tolerance .0001"; hardness, O.K. and "bad"; diameter, five groups of .0001" difference, plus over and under.



A few of the many dimensional inspections possible with automatic and sorting gages.

The final inspection of mass-produced, similar parts is automatically accomplished by Federal Gaging and Sorting. Federal Automatic Gages reduce non-productive inspection time, effect substantial savings in subsequent assembly, and eliminate useless machining of outsized pieces finally discarded as scrap.

The speed of automatic gaging is limited only by the speed of mechanical handling of the workpieces. As for accuracy, extremely high magnifications can be provided (in millionths when necessary) or fairly low magnification and long range. Practically any dimension or several dimensions or dimensional conditions can be gaged by Federal Automatic Sorting Gages.

We have had extensive experience in the design and manufacture of high speed automatic and sorting gages and can recommend equipment to answer your particular needs. Write us for information on all types of automatic gages including multi-dimension, continuous measuring, machine control and automatic sorting gages. Federal Products Corporation, 1211 Eddy St., Providence 1, Rhode Island.

FEDERAL

Largest manufacturer devoted exclusively to designing and manufacturing all types of DIMENSIONAL INDICATING GAGES.

LETTERS

Concluded from preceding page

chance to reclaim scrap and drastically reduce the freight costs at the same time.

Carl McDow
Brooklyn, N. Y.

• *Steel people and scrap dealers agree the idea, if feasible, has merit. Press manufacturers disagree as to whether a cotton baler could be converted into a metal press economically. Presses which make smelter's bales of scrap are three-ram machines with heads or platens of about 14 x 24 inches. Cotton balers, ordinarily, are one-ram machines with a head of about 54 x 27 inches. The cotton baler could only form a loose bale of metals which would need further processing before it could be charged into a furnace. The question is whether it's economically practical to convert a cotton press into a metal press whose bale would require further pressing.—ED.*

Who and Where Department

Can you possibly advise me the name of the manufacturer of a tool bit having the letter "C" inscribed in the cutting edge of the bit.

M. L. Sofransey
1548 Walnut St.
Allentown, Pa.

• *It may be the "circle C" tool bit made by Firth Steel & Carbide Co., Pittsburgh.—ED.*

We would very much appreciate your giving us the address of a company which makes solid steel blades for squaring shears. They are 1¼ inch thick, 4 inches wide, 10 feet 4 inches long.

Samuel Farber
Farber Co.
Pawtucket, R. I.

• *Any help from readers?—ED.*

Reprint Department

The article "Titanium: Middleweight Metal Grows Up" (Oct. 20, p. 63) is very interesting. We would appreciate receiving a reprint of this article.

J. Anderson
C. F. Braun & Co.
Alhambra, Calif.

We will be very grateful if you will be so kind as to send us three reprints of the very fine article "Wrap Up Savings in Scientific Packaging" (Oct. 6, p. 57).

E. G. Butterfield
chief industrial engineer
Lufkin Rule Co.
Saginaw, Mich.

In your Nov. 17 issue, p. 93, there was a very interesting article on foreign machine tools "Foreign Machine Tools: Answer to a Present Need . . . or Threat to Security." I would appreciate receiving one copy of this article.

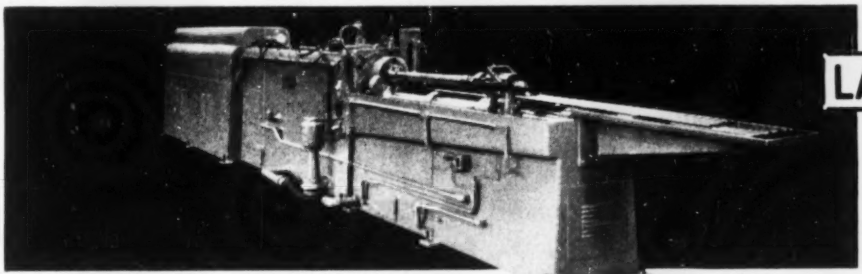
E. L. Hechtermans
Netherlands Trade Commission
Chicago

• *They're on the way.—ED.*

Most ECONOMICAL *Installation*

for RIFLE-BROACHING 20MM GUN BARRELS

with production requirements up to 12 barrels per hour!



LAPOINTE

HP RIFLE BROACHING MACHINE

Large coolant reservoir

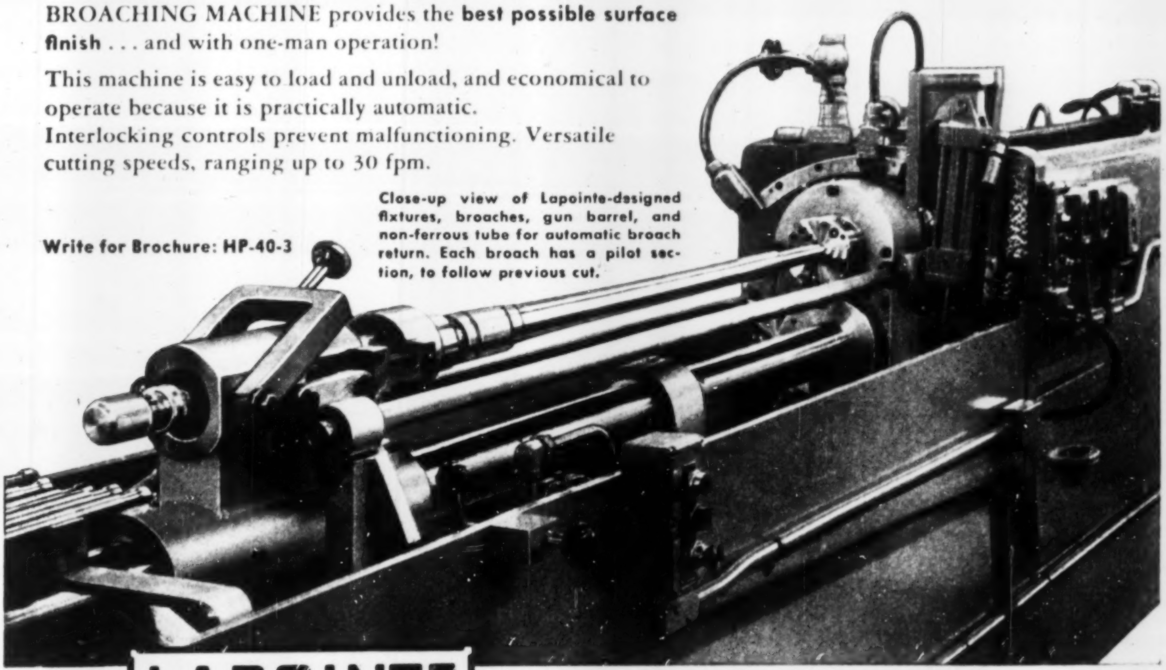
Magnetic filters

Sufficient pressure range (up to 1200 pounds)

Built with a fully automatic **high pressure** coolant system, this LAPOINTE-engineered HP type BROACHING MACHINE provides the **best possible surface finish** . . . and with one-man operation!

This machine is easy to load and unload, and economical to operate because it is practically automatic. Interlocking controls prevent malfunctioning. Versatile cutting speeds, ranging up to 30 fpm.

Write for Brochure: HP-40-3



Close-up view of Lapointe-designed fixtures, broaches, gun barrel, and non-ferrous tube for automatic broach return. Each broach has a pilot section, to follow previous cut.

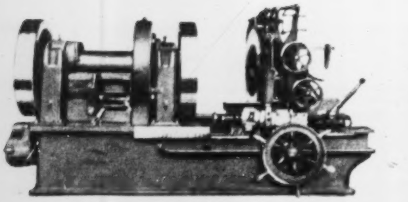
THE LAPOINTE MACHINE TOOL COMPANY

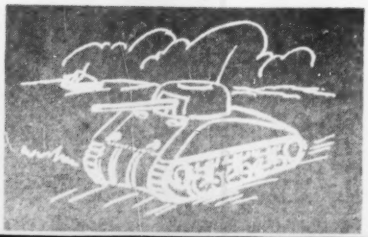
HUDSON, MASSACHUSETTS • U. S. A.

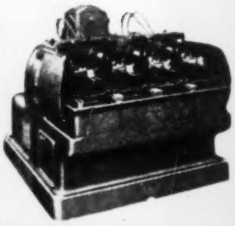
In England: Watford, Herts., England

HUDSON
LAPOINTE
MASS.

THE WORLD'S OLDEST AND LARGEST MANUFACTURERS OF BROACHING MACHINES AND BROACHES

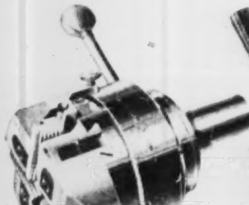


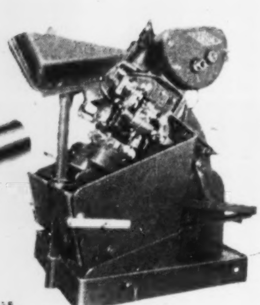


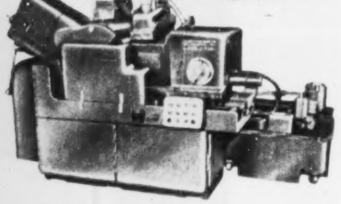


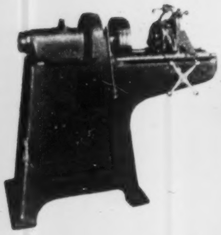
LANDIS THREADS

. . . FOR DEFENSE AND PEACE

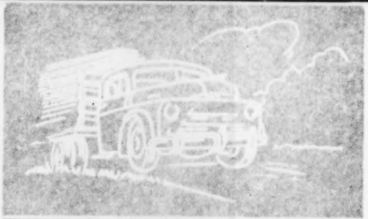


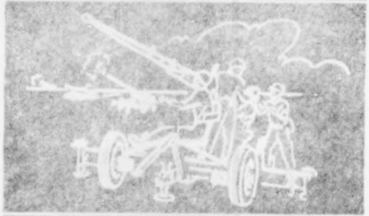


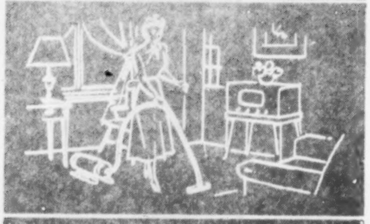


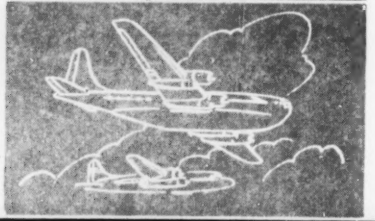


LANDIS MACHINE CO







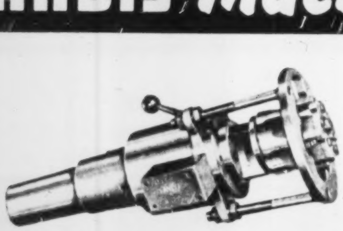


Threads to open bomb doors, or secure warheads on naval rockets—threads to help steer pleasure cars, or to adjust microscopes in research. All of these are produced by one or another of the many types of Landis Threading Equipment, equally adapted to making America strong in war, or building a land of plenty in peace.

Behind this equipment—pipe, bolt, and nipple threading machines, centerless thread grinders, collapsible taps, die heads, chasers—lie years of experience in thread generation and threading equipment manufacture. We offer this know-how to all manufacturers through our Thread Engineering Service. We are ready to help where we can with original thread design, development of threading methods, or adaptation of threading equipment for production. Send us your specifications, or our representative will call at your convenience on request.

50TH ANNIVERSARY

LANDIS *Machine* COMPANY · WAYNESBORO PENNSYLVANIA



AJAXOMATIC POURING UNIT

In Operation at Montrose Division,

BENDIX AVIATION CORPORATION

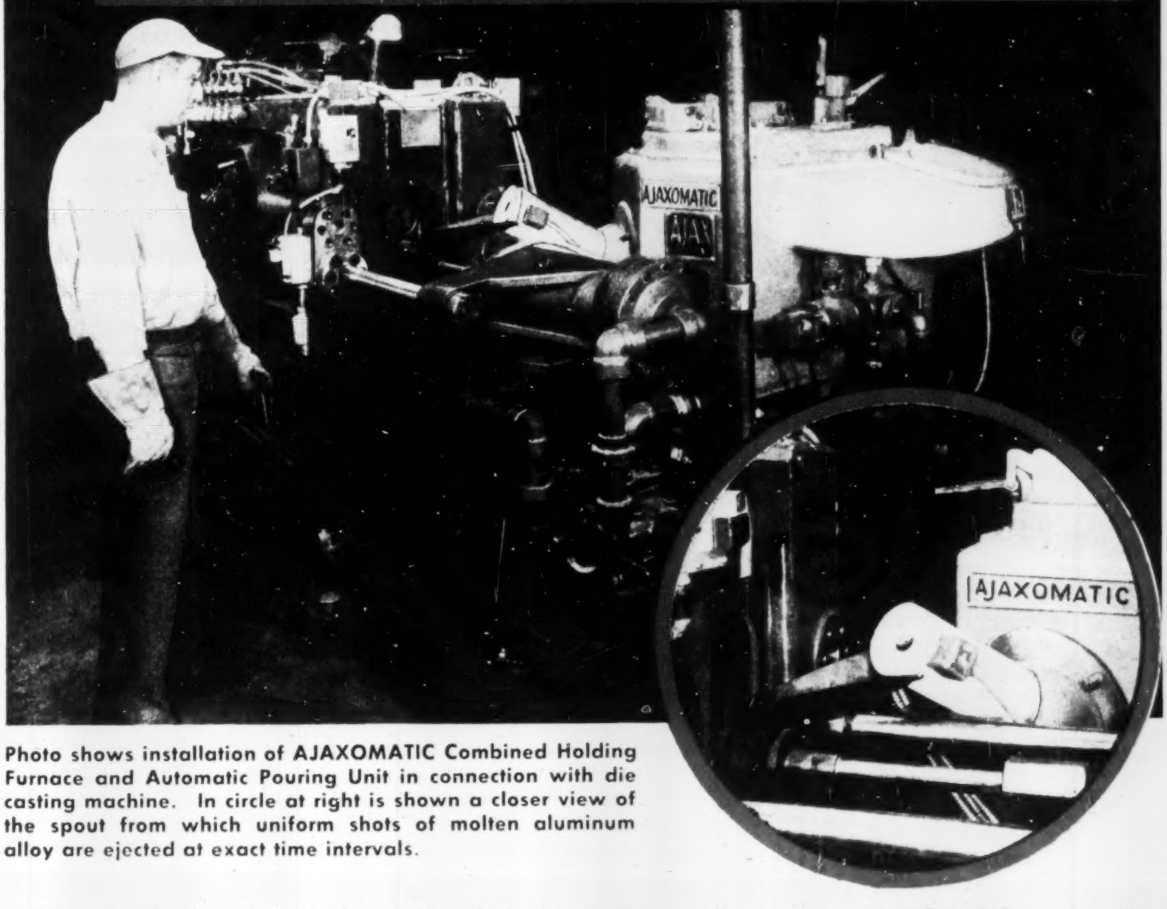


Photo shows installation of AJAXOMATIC Combined Holding Furnace and Automatic Pouring Unit in connection with die casting machine. In circle at right is shown a closer view of the spout from which uniform shots of molten aluminum alloy are ejected at exact time intervals.

Now completely automatic die casting of aluminum alloys is possible in smaller quantities than formerly, and at reduced cost. This fact should be of special interest to the manufacturer who has die casting machines in operation and is doing hand ladling. The unit is entirely sealed, the operator feels no heat, accident hazard is eliminated.

This small, compact AJAXOMATIC* unit will increase production of die castings by as much as 25%, because it delivers regular, uniform quantities of metal into the die casting machine with no delay, immediately after dies are closed. The spout itself is heated and the temperature of each metal shot remains constant.

* Patents Pending

For further information send for descriptive folder A-2

AJAX

TAMA-WYATT

AJAX ENGINEERING CORP., TRENTON 7, N. J.

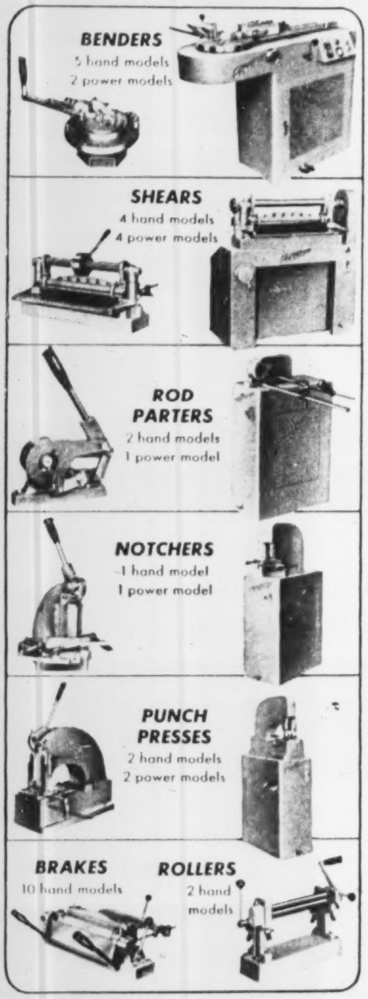
INDUCTION MELTING FURNACE

AJAX ELECTRO METALLURGICAL CORP., and Associated Companies
AJAX ELECTROTHERMIC CORP., Ajax Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC., The Ajax Hultgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax Wyatt Induction Furnaces for Melting

di-acro

PRECISION MACHINES

for Die-less Duplicating



NEW CATALOG
packed with ideas for making parts by "Die-less Duplicating"—the money-saving, time-saving technique created by Di-acro.

BENDING MANUAL
gives exact methods for bending processes in a variety of materials. Over 90 diagrams and charts with suggestions.

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304 8th Ave., Lake City, Minnesota

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"PESADILLA"*
Cured

WITH UDYLITE HI-PRODUCTION LUCITE PLATING BARRELS!

Here's what Mr. J. Sulser, owner and operator of one of Rio de Janeiro's most up-to-date plants[†], thinks of Udylite equipment.

"Our plant practically runs itself. No more production headaches. No more dangerous bottlenecks or equipment breakdowns, thanks to our twenty-one Udylite Plating Barrels."

After creating his new South American barrelplating plant built around Udylite equipment, Mr. Sulser is getting high production, low dragout losses and *NO* overtime! And what's more, he's getting all these benefits with work normally considered too small for barrelplating.

If you're having production troubles, why not let The Udylite Corporation help you, too? A complete research staff . . . plus production know-how . . . are at your service. See your Udylite technical representative or write direct. *The Udylite Corporation, Detroit 11, Michigan.*

*HEADACHE

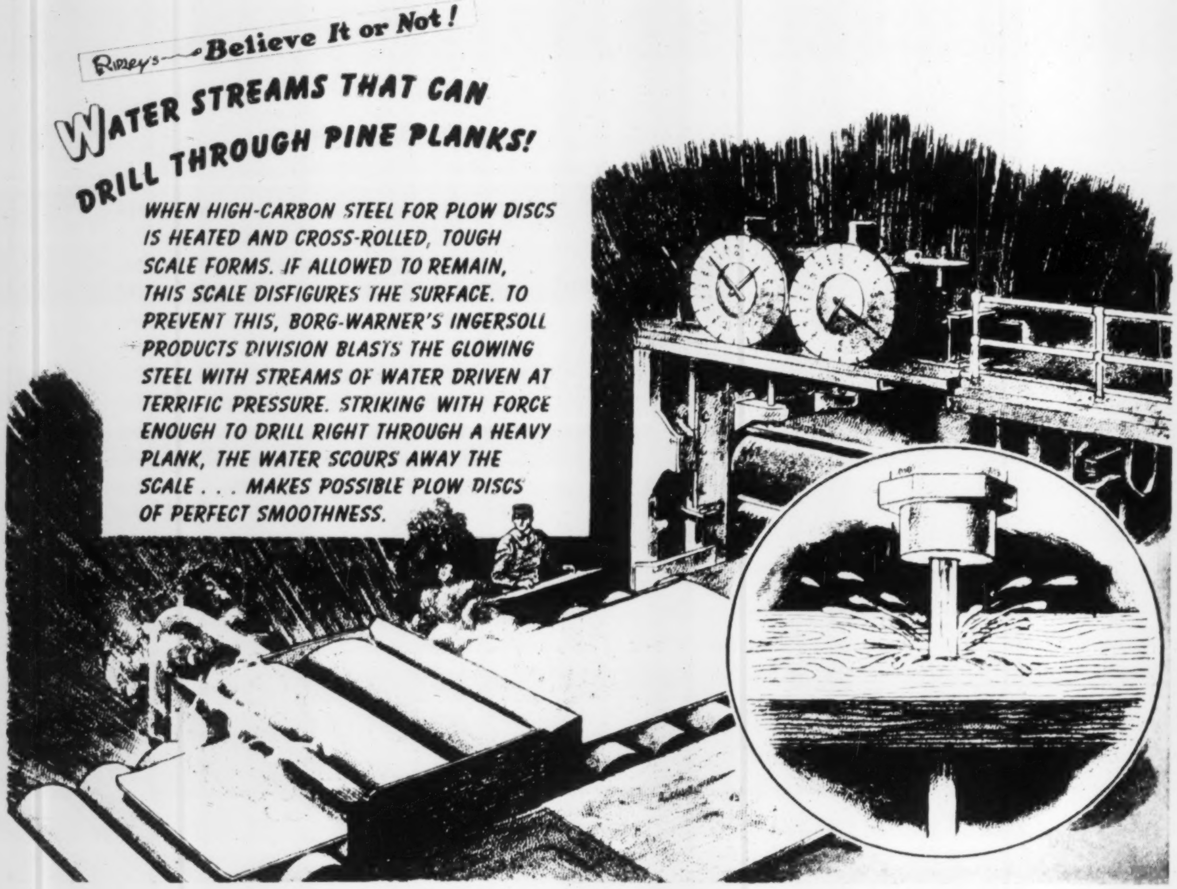
[†] Companhia Fábrica De Botões E Artefactos De Metal

PIONEER OF A BETTER WAY IN PLATING

**THE
Udylite
CORPORATION
DETROIT 11, MICHIGAN**

DE LAVAL
DESCALING
SPRAY PUMPS

deliver the punch



Ripley's Believe It or Not!

WATER STREAMS THAT CAN DRILL THROUGH PINE PLANKS!

WHEN HIGH-CARBON STEEL FOR PLOW DISCS IS HEATED AND CROSS-ROLLED, TOUGH SCALE FORMS. IF ALLOWED TO REMAIN, THIS SCALE DISFIGURES THE SURFACE. TO PREVENT THIS, BORG-WARNER'S INGERSOLL PRODUCTS DIVISION BLASTS THE GLOWING STEEL WITH STREAMS OF WATER DRIVEN AT TERRIFIC PRESSURE. STRIKING WITH FORCE ENOUGH TO DRILL RIGHT THROUGH A HEAVY PLANK, THE WATER SCOURS AWAY THE SCALE . . . MAKES POSSIBLE PLOW DISCS OF PERFECT SMOOTHNESS.

The pump that delivers the punch is one of the new De Laval Oppeller pumps.

De Laval builds a complete line of multistage opposed impeller pumps for this service. Sizes range from two to eight stages for pressures to 1,200 psi, capacities to 1,000 gpm and temperatures to 350F. Impellers are mounted to provide leak-proof shaft sealing between stages. The shaft is exposed to insure freedom from distortion. Stuffing boxes are removable. Positive interstage wearing rings eliminate leakage.

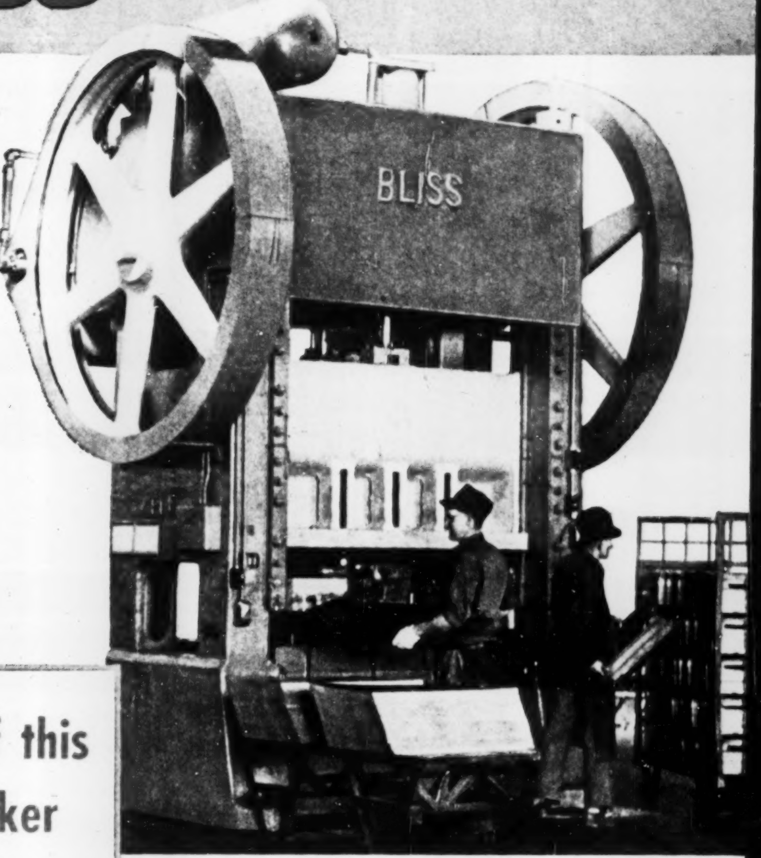
For a host of steel plant jobs, it pays to decide on *quality-designed* De Laval equipment. Look into the advantages of De Laval blast furnace blowers, coke oven boosters and exhausters, general service and process pumps, mechanical drive turbines and worm gear speed reducers. Consult your De Laval Field Engineer.

DE LAVAL *Oppeller Pumps*

DE LAVAL STEAM TURBINE COMPANY
Nottingham Way, Trenton 2, New Jersey

DL 150

The trend is to more stampings WITH BLISS PRESSES...



NEW 250-TON PRESS is typical of modern Bliss installations at Corry-Jamestown Mfg. Corp. This straight-side press features a sturdy box-frame construction and extra-long slide adjustment.

95% of presses of this leading desk maker are Bliss-Built!

When it comes to making steel office desks and files, Corry-Jamestown Mfg. Corp., Corry, Pa., is an acknowledged leader. And when it comes to choosing press equipment, Corry naturally turns to the leader in the press field—Bliss.

Throughout Corry-Jamestown's three plants, 95% of the presses are *Bliss-Built*. And in its newest plant, *100%* of the presses over 10-ton capacity are *Bliss-Built*.

Rugged Bliss Straight-Side and Inclinable Presses have helped Corry maintain high quality, speed production, and minimize costs of stampings for its "STEEL AGE" desks and files.

Your local Bliss sales engineer—the trained representative of the world's largest press builder—can show you why Bliss belongs in *your* press room. Remember, Bliss can supply the right press for a given job or a complete press room.

E. W. BLISS COMPANY, CANTON, OHIO
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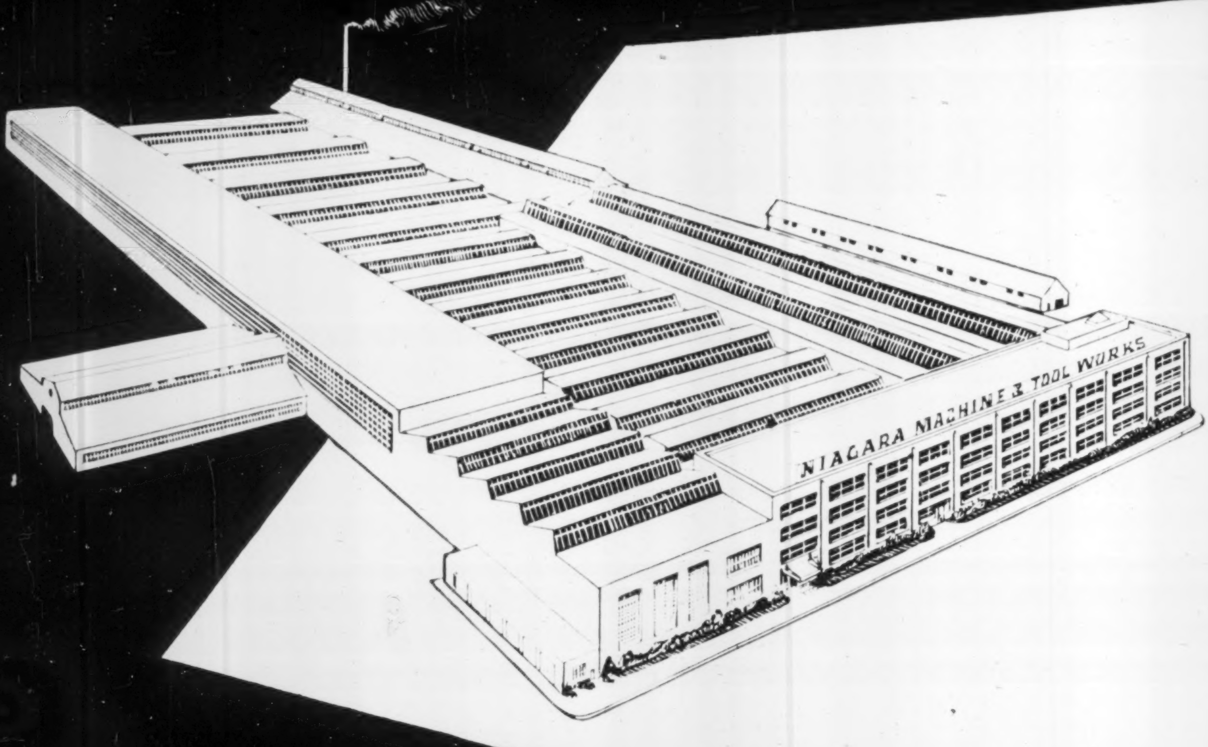
PRESSES, ROLLING MILLS, SPECIAL MACHINERY

Branch offices in Chicago, Cleveland, Dayton, Detroit, Indianapolis, New Haven, New York, Philadelphia, Rochester, Toledo, and Toronto, Canada. **West Coast Representatives:** Moore Machinery Company, Los Angeles and San Francisco; Star Machinery Company, Seattle. **Other dealers** in United States cities and throughout the world.

BLISS ON YOUR PRESS IS MORE THAN A NAME...IT'S A *GUARANTEE!*

NIAGARA

The home of America's Most Complete Line of Presses, Shears, Machines and Tools for Sheet Metal Work



This modern Niagara plant is the result of an unbroken record of 72 years of growth and accomplishment under one management . . . that of its founders and their successors trained in the business of designing and building machines superlatively well.

NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.

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Since 1879

POWER MACHINERY

- Mechanical Presses
- Hydraulic Presses
- Press Brakes
- Squaring Shears
- Rotary Shears
- Flangers
- Slip Roll Formers
- Groovers
- Seamers
- Folders
- Rotary Machines
- Drum Making Equipment
- Electric Automatic Welders

HAND OR FOOT OPERATED MACHINES AND TOOLS

- Squaring Shears
- Rotary Shears
- Bench Shears
- Lever Shears
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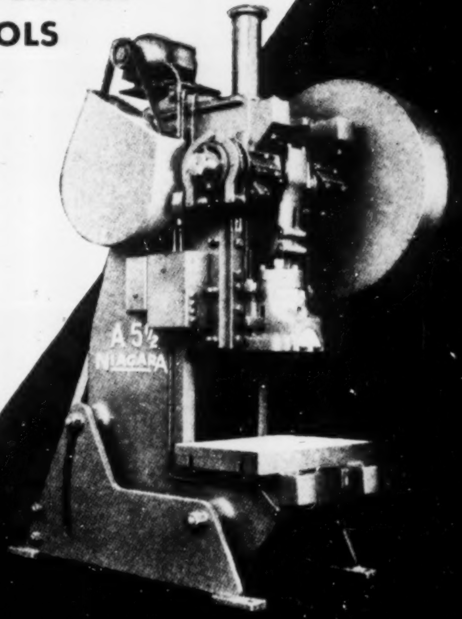
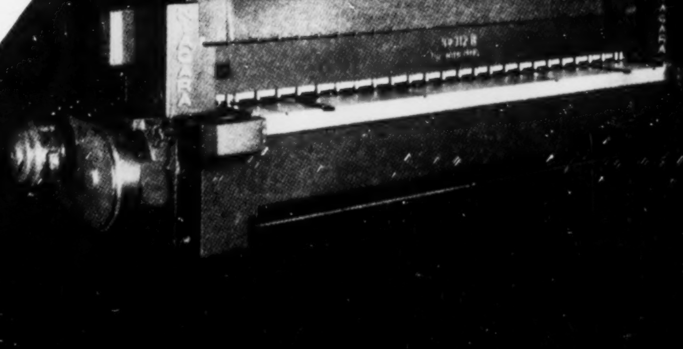
- Slip Roll Formers
- Groovers
- Seamers
- Folders
- Rotary Machines
- Hand Tools





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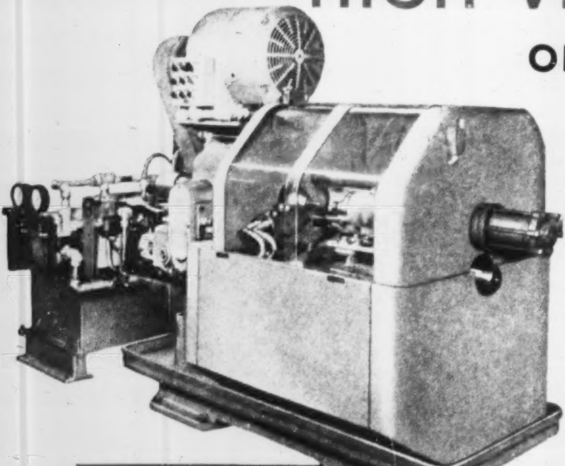
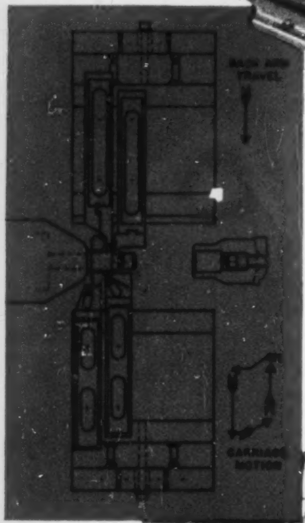
AUTOMATICITY BACKS UP HIGH VELOCITY TURNING ON FAY AUTOMATICS



SIDE GEARS

18 Seconds Floor to Floor — 635 SFM

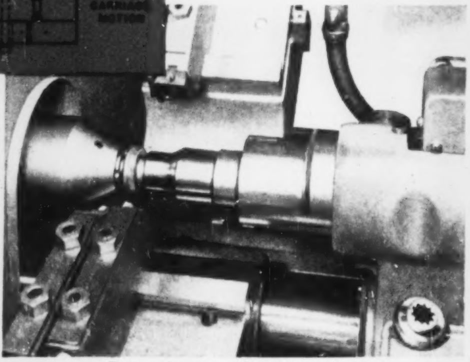
Two 8" Fays, with Automatic Sequential Control, machine all exterior surfaces of the blanks in two operations; one machine for each. The major diameter is 2-15/16" and floor to floor time is approximately 18 seconds in each operation.



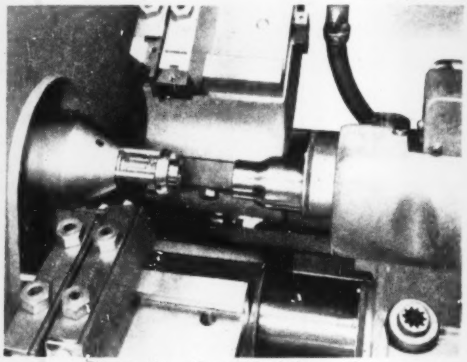
Automatic Cycle—The machines are equipped with automatically operated splash guards and automatically air-operated tailstock rams for pressing the blank onto a splined arbor equipped with automatically operated ejector pins.

The operator places the blank on the end of the arbor, and pushes the cycle start button. *Automatically, the guard closes, the tailstock ram presses the piece onto the arbor and then retracts. The carriage turns, the back arm faces, and at the end of the cuts, ejector pins push the piece onto the loading section of the arbor* from which it is removed manually.

FIRST OPERATION: Note intricate movements of the carriage, which turns the hub, back angle and major diameter. The back arm faces and forms.



Tailstock presses blank on arbor



Ejector pins release blank from arbor

P.S. *Production management regularly relies upon the engineering services of Jones & Lamson for the latest information on methods, costs, tooling and performance. Why not consult us about YOUR turning, threading and inspection problems.*

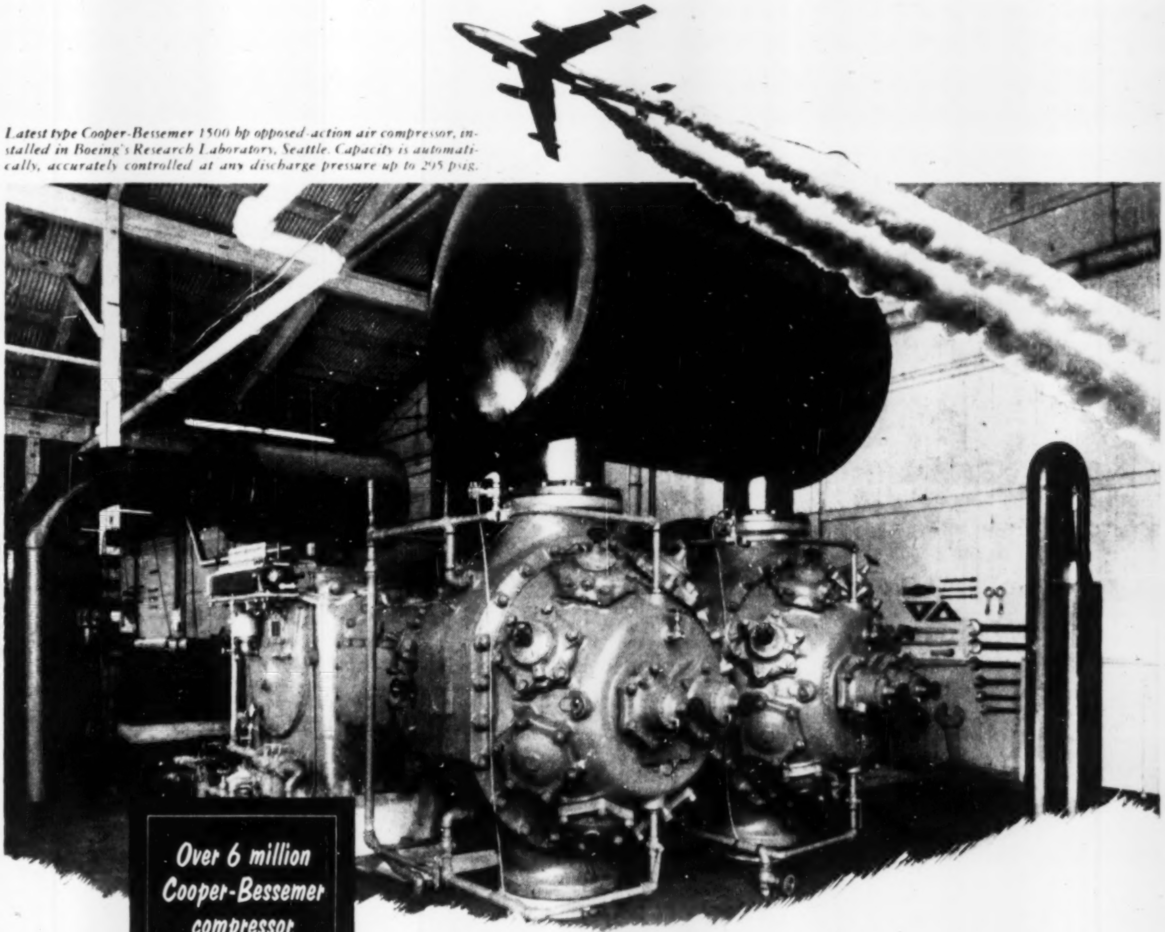
JONES & LAMSON

Machine Tool Craftsmen
Since 1835

JONES & LAMSON MACHINE CO., 517 Clinton St., Dept. 710, Springfield, Vt., U.S.A.

FAY LATHE DIVISION

Latest type Cooper-Bessemer 1500 hp opposed-action air compressor, installed in Boeing's Research Laboratory, Seattle. Capacity is automatically, accurately controlled at any discharge pressure up to 295 psig.



Over 6 million Cooper-Bessemer compressor horsepower NOW IN USE!

Modern air power on land

HELPS GAIN NEW POWER IN THE SKY!

HERE are two kinds of air power—Boeing's amazing new B-47 Stratojet, shown in a Jato takeoff, and a modern Cooper-Bessemer motor-driven air compressor. Installed in Boeing's Research Laboratory almost a year ago, this big compressor supplied air under pressure for testing many of the B-47 parts, will go on year after year contributing to Boeing's broad development program.

The latest Cooper-Bessemer compressor developments offer new advantages, new economies to plants everywhere . . . wherever air is a tool. For example, modern opposed-action design means greater space-saving compactness, vibration-free operation, higher efficiency, and longer life with less maintenance.

So when it comes to air or power, it will pay you to write for the latest Cooper-Bessemer bulletins. Find out about the *new* things being done by one of America's *oldest* builders of engines and compressors.

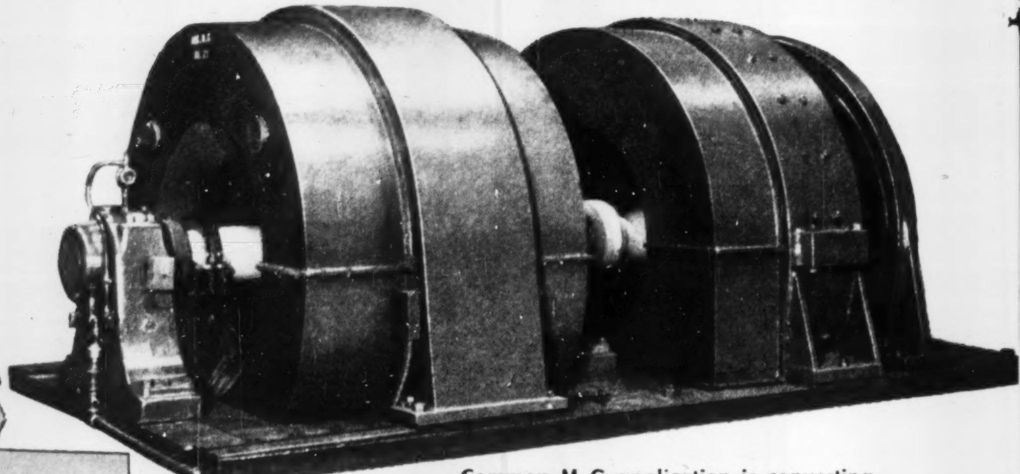
The Cooper-Bessemer Corporation

MOUNT VERNON, OHIO GROVE CITY, PA.

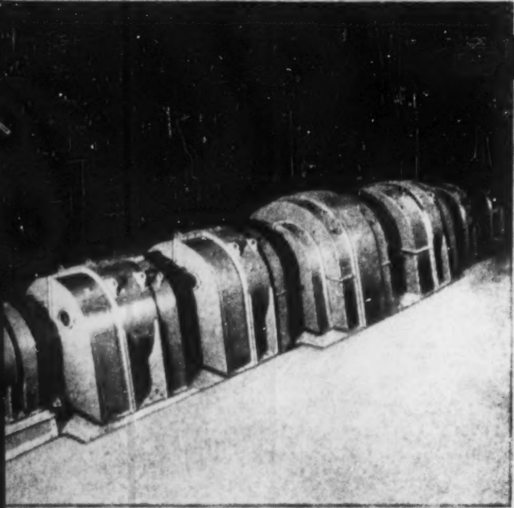
New York • Chicago • Washington • San Francisco • Los Angeles • San Diego • Houston • Dallas • Odessa • Pampa • Greggton • Seattle • Tulsa • St. Louis • Gloucester • New Orleans • Shreveport
Cooper-Bessemer of Canada, Ltd., Halifax, N. S.

DIESELS • GAS ENGINES • GAS-DIESELS • ENGINE-DRIVEN AND MOTOR-DRIVEN COMPRESSORS • HIGH PRESSURE LIQUID PUMPS

From Coast

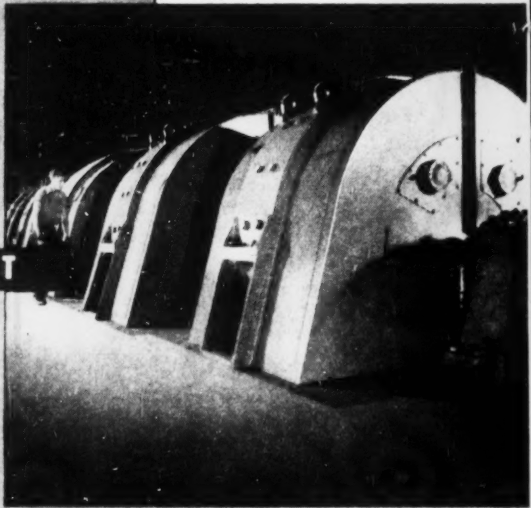


Common M-G application is converting ac to dc for mill supply. Above is a 1500 kw synchronous set in eastern mill.



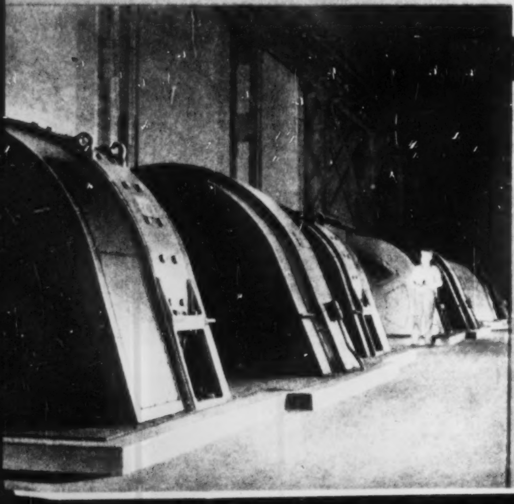
WEST

This 8-machine 2000 kw M-G set supports a two stand, four high tin temper mill with generators opposite their mill motors.



MIDWEST

A 56-inch, four stand tandem cold reduction mill is supported by this 7-machine 7750 kw synchronous motor-generator set.



EAST

Three 3-machine 6000 kw synchronous M-G sets supporting six finishing stand motors in a large East Coast steel rolling mill.

TEMPER MILL

Three midwestern single stand temper mills are supported by these M-G sets. Synchronous motors of 1750 hp drive each set.

to Coast!

ALLIS-CHALMERS M-G SETS ARE WIDELY USED IN SUPPORT OF STEEL MILL DC DRIVES

MAJOR STEEL PRODUCERS from Coast to Coast use Allis-Chalmers motor-generator sets. This nationwide acceptance in heavy duty service is proof of their durability and quality.

These representative M-G sets indicate the wide variety in design and size available. Allis-Chalmers has long experience with steel mill needs — having built M-G sets for all current applications — and will build special for any new requirement that may arise.

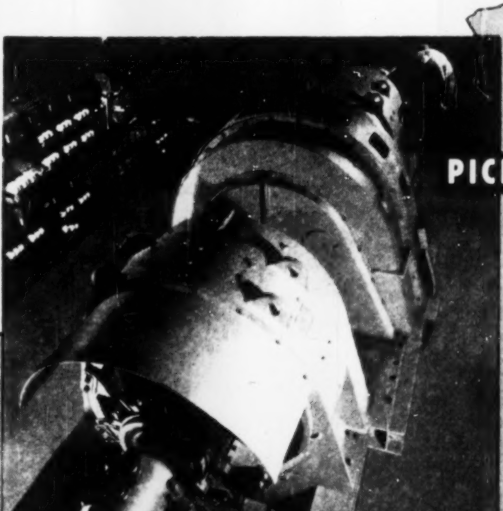
Motor-generator sets give you:

1. Power factor correction.
2. Regenerative braking.
3. Quick starting for emergency demand.

Only Allis-Chalmers gives you M-G sets with the exclusive *Frog-Leg* armature winding that ***eliminates injurious commutator sparking.*** *Frog-Leg* winding connects bars of equal potential through the winding itself . . . producing a perfectly equalized winding without the use of cross-connectors.

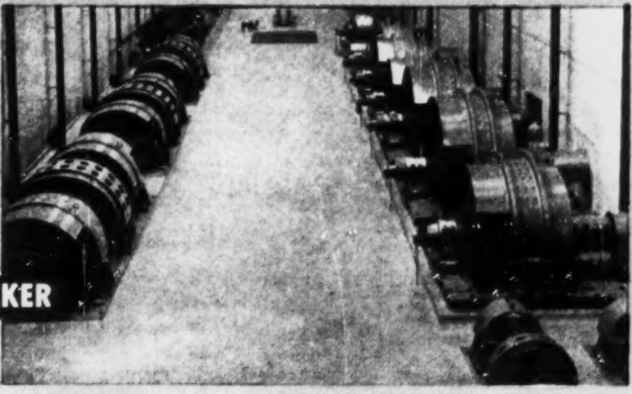
For full details on this heavy duty steel mill rotating equipment, ask for M-G Set Bulletin 05B6032A and Large DC Motor Bulletin 05B6002A. For your copies, just call the nearest A-C office or write direct to Allis-Chalmers, Milwaukee 1, Wisconsin. A-3920

Frog-Leg is an Allis-Chalmers trademark.



PICKLING LINE

A pickling line in an eastern steel mill is supported by this 4-machine 1375 kw, 720 rpm synchronous M-G set.



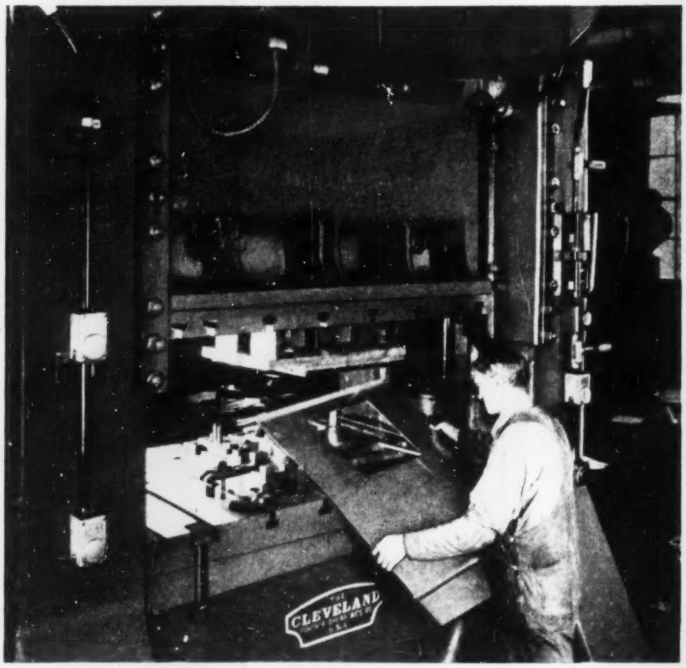
RECORD BREAKER

A motor room, completely equipped by Allis-Chalmers, powered this 80-inch western hot strip mill to a new annual world tonnage record.

ALLIS-CHALMERS

A-C
ALLIS-CHALMERS

Power, Electrical, Processing Equipment for Iron and Steel



CLEVELAND PRESSES

pay for themselves

in increased production . . .

in economy of operation . . .

in improved product quality . . .

• Leading manufacturers find that Cleveland press design and construction pays big production dividends. All gears and drive units of the Cleveland Two-Point Press shown here are enclosed within the crown. This elimination of outboard brackets provides greater operator safety . . . makes the press frame more rigid for lasting accuracy. This modern construction makes it convenient to load and unload dies.

For utmost precision, this press is equipped with a Cleveland (patented) electrically controlled, air operated, drum-type friction clutch with spring loaded brake. Instantaneous in action, it gives the operator positive control at any point of the stroke. This lightweight clutch has few moving parts. Requiring minimum maintenance, it reduces press down-time and uses less power for operation.

It will pay you to invest in new Cleveland Presses. Made in a complete range of types, sizes and capacities, there is sure to be a Cleveland that meets your production requirements. Write or call today! A 6690

THE CLEVELAND PUNCH & SHEAR WORKS CO.
U. S. A.

Established 1880

PUNCHING TOOLS & DIES

FABRICATING TOOLS

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NEW YORK . . . . CHICAGO
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STRETCH OUT YOUR STAINLESS, TOO

There *are* ways to stretch out your supply of stainless.

For example, you may be using a grade or finish of stainless that is in extreme demand when another similar one, not as tight, could do the job adequately.

Our metallurgical staff and stainless fabricating specialists are ready to help you look into this matter and to advise you on more readily-available types of stainless that will do a satisfactory job. Feel free to call on us for this specialized help.

CRUCIBLE first name in special purpose steels

52 years of Fine steelmaking

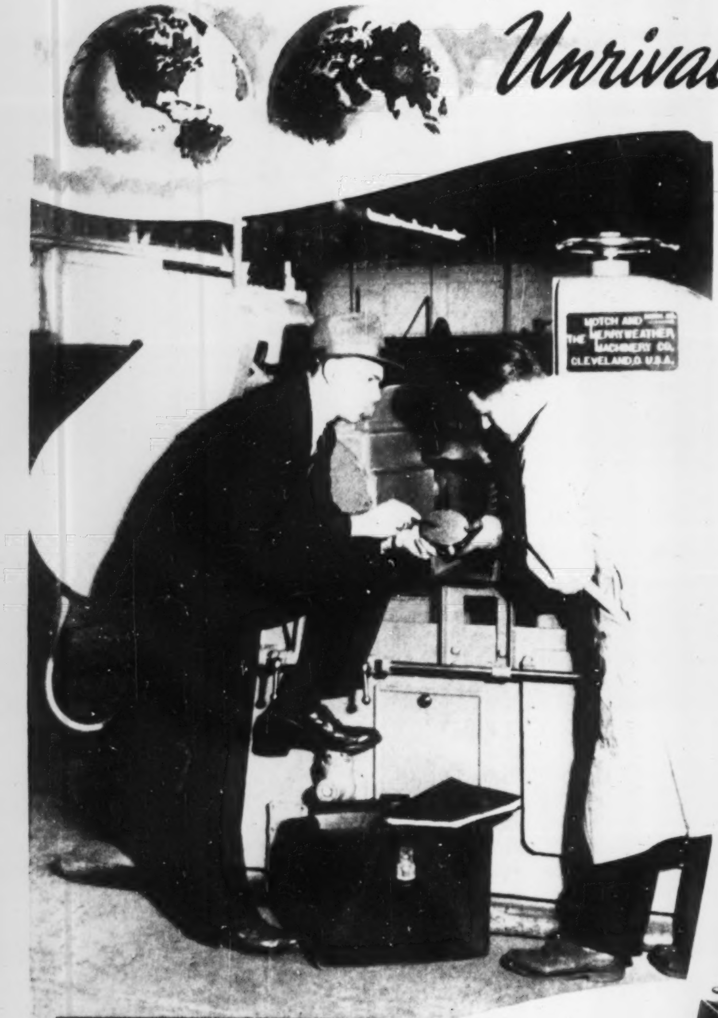
STAINLESS STEEL

CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

REZISTAL STAINLESS • REX HIGH SPEED • TOOL • ALLOY • MACHINERY • SPECIAL PURPOSE STEELS

NOWHERE ELSE on earth....

can you command Motch & Merryweather's *Unrivalled Experience!*


MOTCH AND
THE MERRYWEATHER
MACHINERY CO.
CLEVELAND, O. U.S.A.

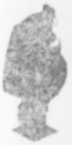
... A KNOW-HOW THAT SPRINGS FROM MANY YEARS OF BUILDING CIRCULAR SAWING MACHINES, BLADES AND BLADE GRINDERS, AND CORRELATING "ALL 3" PROFITABLY ON THE JOB

Motch & Merryweather's unmatched experience in the field of circular sawing brings you a know-how which insures profitable operation — *invariably.* To sign an order for an M. & M. machine is to be sure of complete satisfaction. Your purchase will perform as it should. We will see to that — *invariably.*

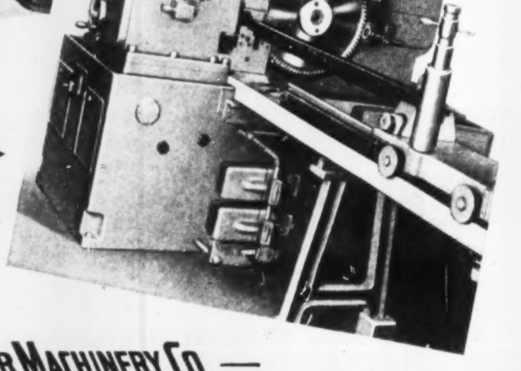
MACHINES *for cutting off to 36" dia.*

CUT-OFF BLADES *up to 96" dia.*

SHARPENERS *for blades to 96" dia.* →



MP/SF
Most Production per Square Foot



• *Motch & Merryweather No. 2 Automatic Circular Sawing Machines cut off ferrous or non-ferrous metals up to 6" fast, clean, without burrs, profitably.* →

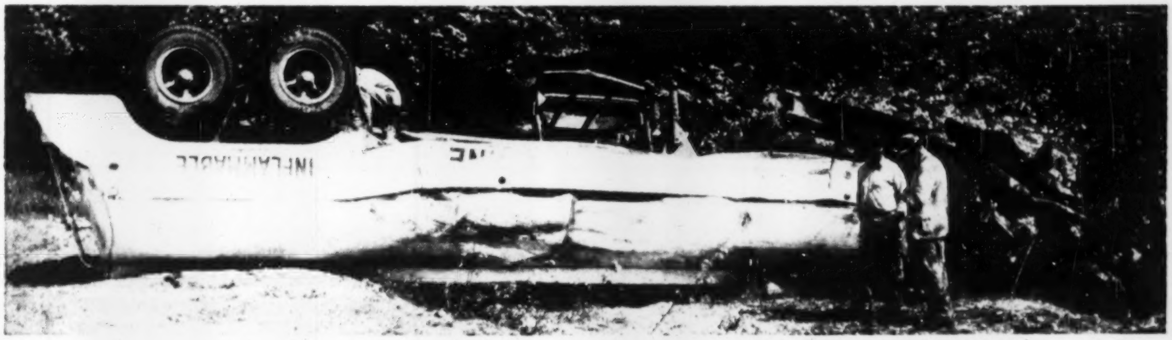
Manufactured by — **THE MOTCH & MERRYWEATHER MACHINERY CO.** —

CLEVELAND 13, OHIO

Builders Also of Production Milling, Vertical Turning, Automatic and Special Machines

Only
M & M builds
ALL 3:
CIRCULAR SAW
SAW BLADE
BLADE GRINDER

PRODUCTION-WITH-ACCURACY • MACHINES AND EQUIPMENT



Picture above of the wreck in which the tractor was demolished, while the tank Trailmobile of high-strength Otiscoloy held its cargo intact, (below) the same trailer, thirty days later, after being rebuilt.

GASOLINE
INFLAMMABLE
GASOLINE
P.S.C. T-5816X
O.C.C. 4957
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C.C. 86928

J&L OTISCOLOY HIGH STRENGTH STEEL *plus* TRAILMOBILE CONSTRUCTION

Saved the day for this cargo of gasoline

When forced off a Missouri highway, this gasoline tank Trailmobile went over a high embankment, turned over twice and landed upside down—*but did not lose a gallon of its highly-inflammable cargo.* The tractor pulling the Trailmobile was completely demolished.

Trailmobile Inc., renowned for superior trailers, made a smart move when they selected high-strength J&L Otiscoloy Steel for Trailmobile construction. J&L Otiscoloy (with twice the yield strength of mild steel) will stand up better and longer under the severe impact and fatigue conditions of modern trailer operation.

In addition, J&L Otiscoloy's great strength permits Trailmobile to employ lighter weight sections in the construction—thereby cutting deadweight—and permitting Trailmobile trailers to haul larger payloads within the legal weight limits.

Finally, equipment builders such as Trailmobile have found that the ease of welding Otiscoloy lends itself to their production techniques and helps assure a strong, sound, finished product (as demonstrated in the photo above).

Why don't you check into the possibility of using J&L Otiscoloy to advantage in your operation? Send for a free copy of our booklet: "J&L Otiscoloy—The Transportation Steel." Or get in touch with the J&L representative nearest you.

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH 30, PA.

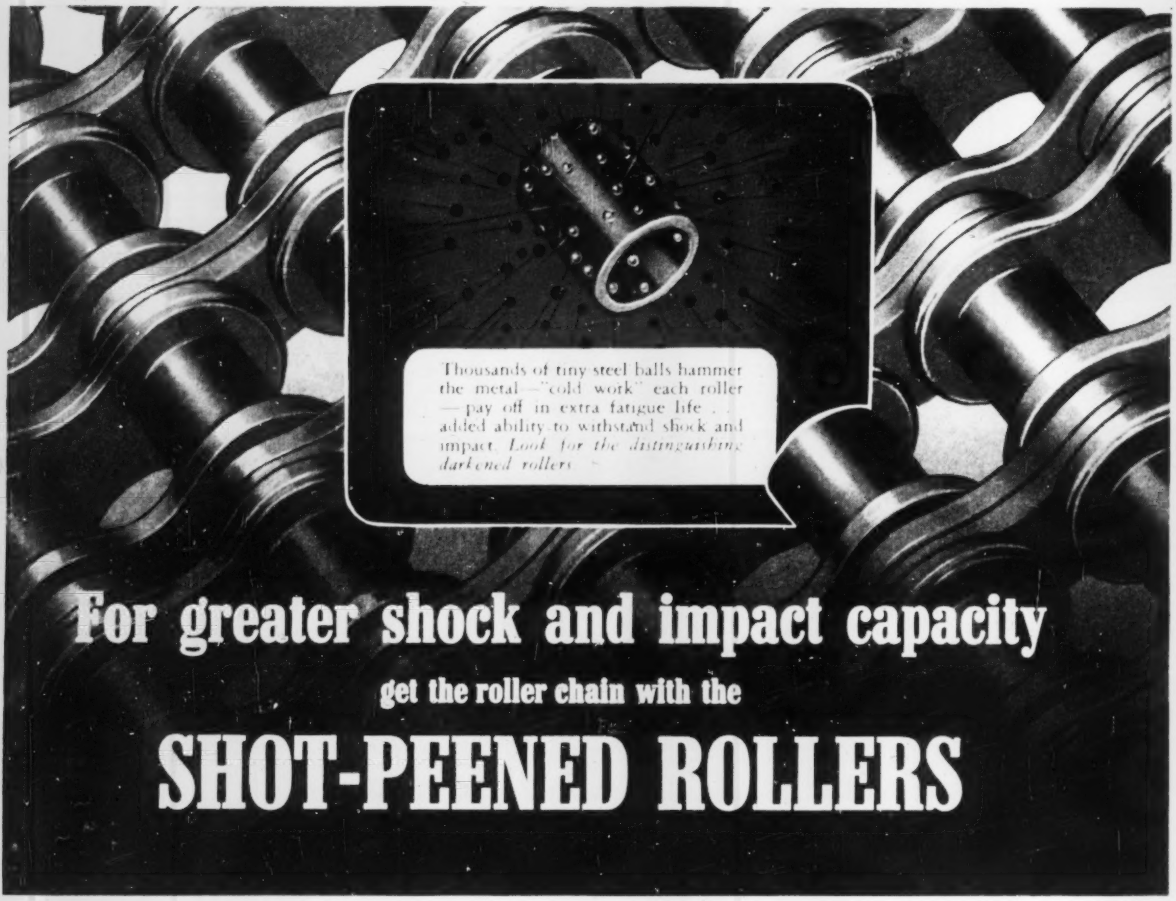
J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION
404 Liberty Avenue • Gateway Center, Pittsburgh 30, Pa.
Please send me a copy of your booklet—"J&L Otiscoloy—The Transportation Steel."

Name

Company

Address


Thousands of tiny steel balls hammer the metal—"cold work" each roller—pay off in extra fatigue life . . . added ability to withstand shock and impact. *Look for the distinguishing darkened rollers*

For greater shock and impact capacity

get the roller chain with the

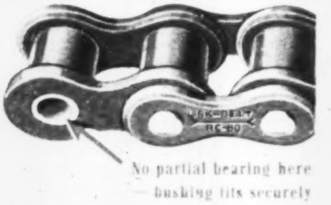
SHOT-PEENED ROLLERS

...one of the extra-wear features you get with every LINK-BELT Roller Chain

JUST as shot-peened rollers give you extra fatigue life—so do Link-Belt's exclusive lock-type bushings multiply roller chain's capacity to withstand shock loading. And there are many other engineering extras that make Link-Belt Precision Steel Roller Chain your best buy for drive and conveying service.

You can choose from the complete range of Link-Belt Precision Steel Roller Chain. Ask your nearest Link-Belt office for full particulars on single or multiple widths, in ⅝" through 3" single pitch, or double pitch; 1" through 3".

Lock-type Bushings increase ability to withstand severe operating conditions


LINK-BELT
RC-80
No partial bearing here — bushing fits securely

A special manufacturing process securely locks the inside sidebars on the bushing, preventing lateral movement of the sidebars and eliminating a common cause of stiff chains. This Link-Belt development is applied on roller chains through 1" pitch and double pitch roller chains through 2" pitch. 12,68

LINK-BELT

PRECISION STEEL ROLLER CHAIN

LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa), Sydney (Australia). Offices, factory branch stores and distributors in principal cities.

Which brick should I use for better furnace walls?
J-M Insulating Fire Brick . . . they're light-weight and quick-heating, too!

6 types . . . for savings in services up to 3000F

Because of their quick-heating and low-heat transfer characteristics, Johns-Manville Insulating Fire Brick are efficient fuel-savers for use at operating temperatures up to a full 3000F on the insulation.

Each type of J-M Insulating Fire Brick has the correct balance of thermal and physical properties that assures maximum economies within a specific temperature range. All types are *quick-heating* . . . operating temperatures are reached in a short time, thereby saving fuel.

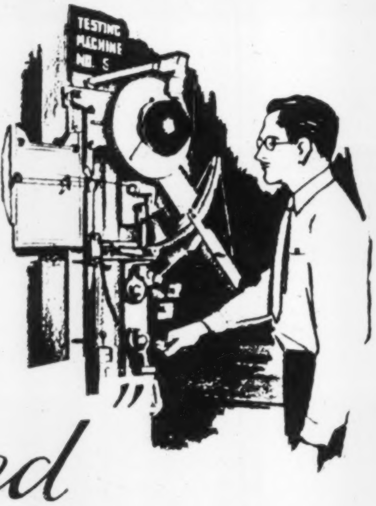
Identical materials can also be obtained in large size units known as Johns-Manville Insulating Fireblok. Fireblok have the same properties as the brick, but are made in extra large sizes for added construction economies. The large units can be installed faster . . . require fewer joints and less bonding mortar. During rebuilding or repair, furnace down-time is appreciably shortened with Fireblok construction.

A Johns-Manville insulation expert will gladly explain the advantages and economies of using J-M Insulating Fire Brick and Fireblok for refractory linings or as back-up insulation behind other refractory protection. Write to Johns-Manville, Box 60, New York 16, N. Y. In Canada, write 199 Bay St., Toronto 1, Ontario.

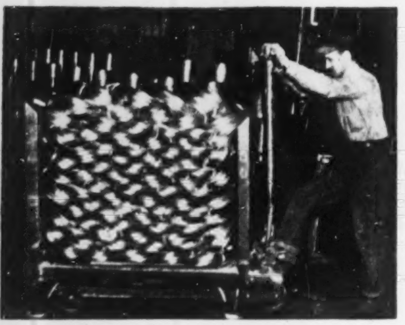
Properties	Types of Insulating Fire Brick and Fireblok					
	JM-3000	JM-28	JM-26	JM-23	JM-20	JM-1620
Temperature limit	†3000F	†2800F	†2600F	†2300F	†2000F	‡2000F †1600F
Density, lb per cu ft	63–67	58	48	42	35	29
Transverse strength, psi	120	120	125	120	80	60
Cold crushing strength, psi	300	150	190	170	115	70
Linear shrinkage, percent	*0.8 at 3000F	4.0 at 2800F	1.0 at 2600F	0.3 at 2300F	0.0 at 2000F	0.0 at 2000F
Reversible thermal expansion, percent	0.5–0.6 at 2000F	0.5–0.6 at 2000F	0.5–0.6 at 2000F	0.5–0.6 at 2000F	0.5–0.6 at 2000F	0.5–0.6 at 2000F
Conductivity (Btu in. per sq ft per F per hr at following mean temperatures)						
500F	3.10	2.00	1.92	1.51	0.97	0.77
1000F	3.20	2.50	2.22	1.91	1.22	1.02
1500F	3.35	3.00	2.52	2.31	1.47	1.27
2000F	3.60	3.50	2.82	2.70		

*24-hr Simulative Service Panel Test; all others 24-hr soaking period. †Back-up or exposed ‡Back-up only.

Johns-Manville *first in* **INSULATIONS**



"Laboratory Controlled"



Specialty Wires by

JOHNSON

Johnson gives you absolute uniformity of prescribed physical and metallurgical properties. When you specify "Johnson" you get wire drawn on special equipment by men with special skills.

"Johnson Sets the Standard of the Industry"

JOHNSON

STEEL and WIRE COMPANY, INC.

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SUBSIDIARY OF PITTSBURGH STEEL COMPANY

BULLARD MANUFACTURERS OF MACHINE TOOLS

The Invisible Background of Industrial Progress

Lake Arrowhead, San Bernardino, California, is a winter sportsmen's paradise. It has been acclaimed the home of the National Orange Show and is famous for its scenic 101 mile drive on the rim of the world. Being accessible by modern, well maintained roads and transportation facilities its natural beauty and recreational advantages can be enjoyed by more people than ever before. To facilitate year round travel, Diesel motor graders as shown in the illustration clearing snow from the highway, keep the area open for winter sportsmen.

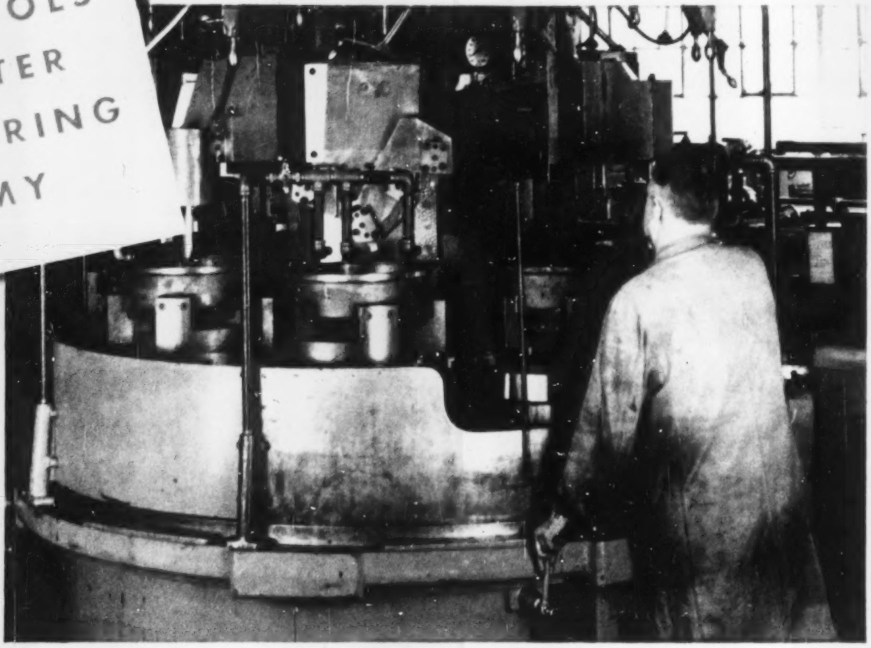
Many Bullard machines are employed for the manufacture of motorized equipment used for highway construction and maintenance, mechanical operations of orange groves and other agricultural enterprises.

★ *Modern Machine Tools* are the key production machines for all American manufacturing plants. Motor manufacturers in particular have for many years recognized and relied on Bullard machines for their efficient, accurate and dependable production.

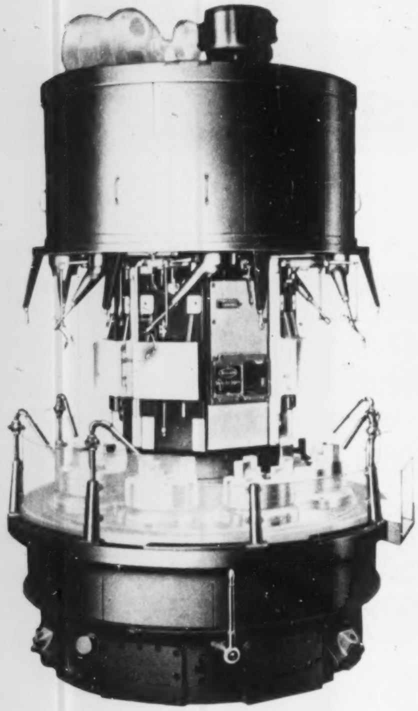
★ *For greater manufacturing economy REFER to next page*

THE BULLARD COMPANY
BRIDGEPORT 2, CONNECTICUT

BULLARD
MACHINE TOOLS
FOR GREATER
MANUFACTURING
ECONOMY



A Mult-Au-Matic on production of heavy Brake Drums. Mult-Au-Matic's versatility makes it adaptable to many types of tooling for many different classes of work.



For many years Mult-Au-Matics have been considered versatile production units whether they were on shorter runs or mass production of identical parts.

From its early adoption in the pleasure car manufacturing industry up to the present time in the manufacture of parts for tractors, airplane engines, electric motors and many other classes of work too numerous to mention, the Mult-Au-Matic has set an important economical manufacturing pace for peacetime as well as defense requirements.

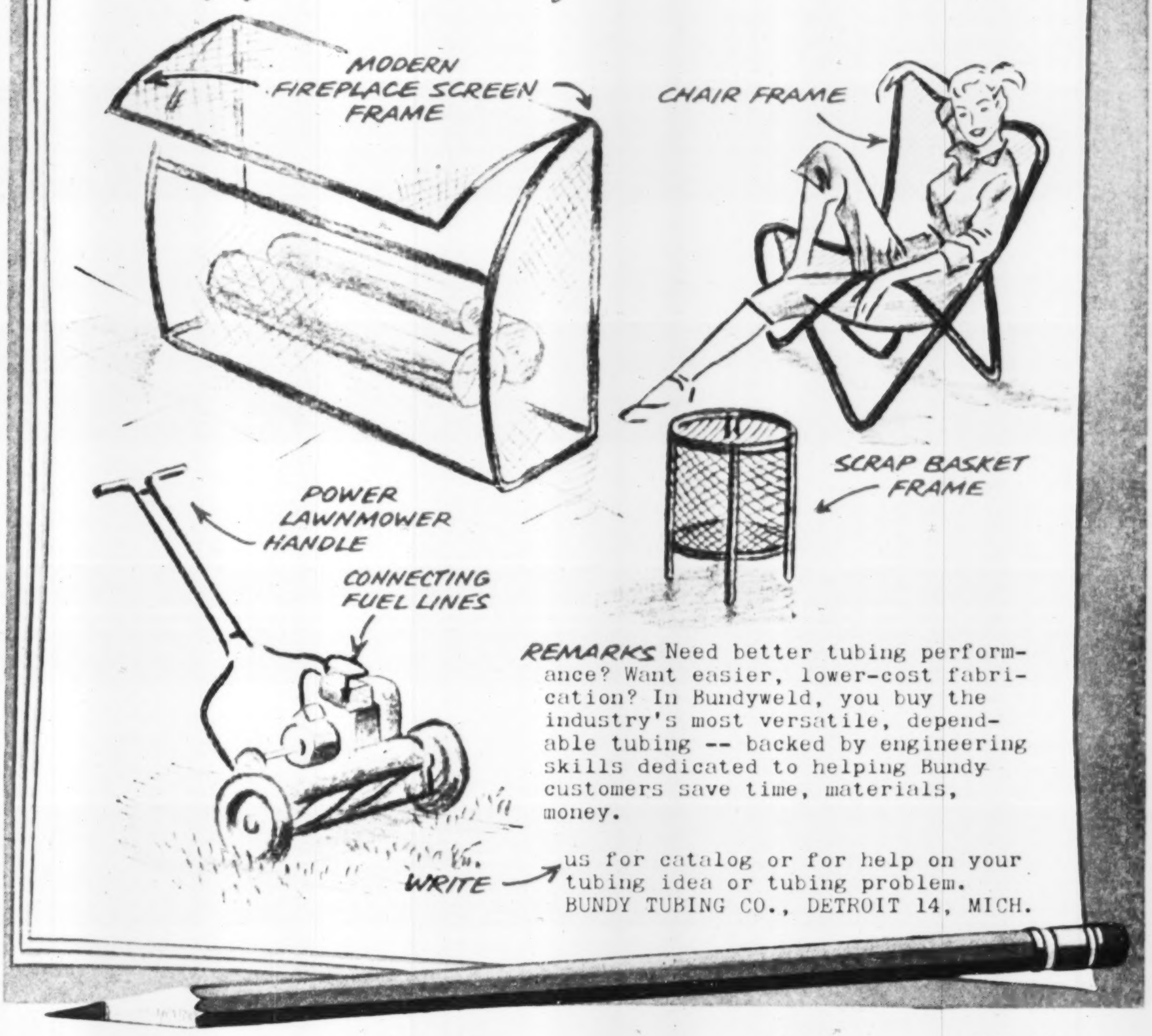
Let Bullard engineers submit surveys on your regular run of work or the more difficult problem jobs.

BULLARD

Time saved is money earned. Write now for information.

THE BULLARD COMPANY BRIDGEPORT 2, CONNECTICUT

FROM *the Bundy Sketchbook*
TO *jog a designer's imagination*



REMARKS Need better tubing performance? Want easier, lower-cost fabrication? In Bundyweld, you buy the industry's most versatile, dependable tubing -- backed by engineering skills dedicated to helping Bundy customers save time, materials, money.

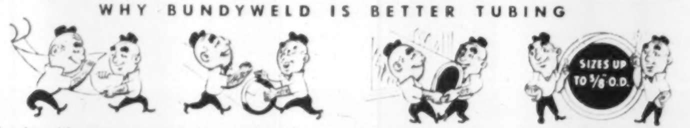
WRITE us for catalog or for help on your tubing idea or tubing problem.
BUNDY TUBING CO., DETROIT 14, MICH.

Bundyweld Tubing

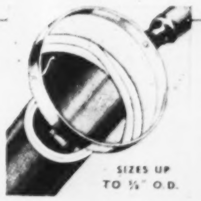
DOUBLE-WALLED FROM A SINGLE STRIP

- **Leakproof**
- **High thermal conductivity**
- **High bursting point**
- **High endurance limit**
- **Extra-strong**
- **Shock-resistant**
- **Ductile**
- **Lightweight**
- **Machines easily**
- **Takes plastic coating**
- **Scale-free**
- **Bright and clean**
- **No inside bead**
- **Uniform I.D., O.D.**

WHY BUNDYWELD IS BETTER TUBING


SIZES UP TO ⅜" O.D.

Bundyweld starts as a single strip of copper-coated steel. Then it's . . . continuously rolled twice around laterally into a tube of uniform thickness, and passed through a furnace. Copper coating fuses with steel. Result . . . Bundyweld, double-walled and brazed through 360° of wall contact.



SIZES UP TO ½" O.D.

←

NOTE the exclusive patented Bundyweld beveled edges, which afford a smoother joint, absence of bead and less chance for any leakage.

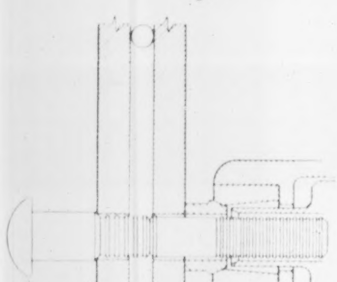
Bundy Tubing Distributors and Representatives: ***Cambridge, 42, Mass.:*** Austin-Hastings Co., Inc., 226 Binney St. • ***Chattanooga 2, Tenn.:*** Peirson-Deakins Co., 823-824 Chattanooga Bank Bldg. • ***Chicago 32, Ill.:*** Lapham Hickey Co., 3333 W. 47th Place • ***Elizabeth, New Jersey:*** A. B. Murray Co., Inc., Post Office Box 476 • ***Philadelphia 3, Penn.*** Rutan & Co., 1717 Sansom St. • ***San Francisco 10, Calif.:*** Pacific Metals Co., Ltd., 3100 19th St. • ***Seattle 4, Wash.:*** Eagle Metals Co., 4755 First Ave., South ***Toronto 5, Ontario, Canada:*** Alloy Metal Sales, Ltd., 181 Fleet St., E. • **Bundyweld nickel and Monel tubing is sold by distributors of nickel and nickel alloys in principal cities.**

Huck Lockbolt* Principle

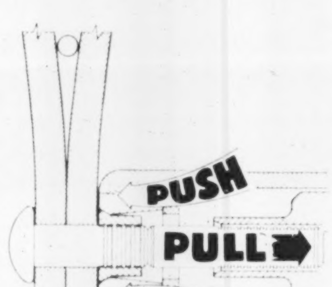
INSURES POSITIVE

Pull-Together

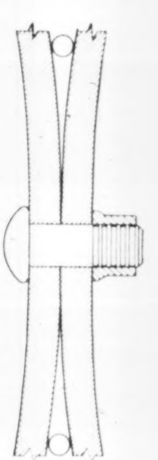
HERE IS HOW *Huck* LOCKBOLTS* PULL TWO PIECES OF WORK TOGETHER



Insert Lockbolt* pin from one side of work. Slide locking collar over pin tail from opposite side of work. Attach driving tool to pin tail.



Pull trigger and tool automatically pulls on pin, pushes on collar, causes Lockbolt pin to fill hole, pulls work together, swages collar, breaks off pin tail and ejects tool.



Result: A positive locked fastener with high tensile preload; a non-deflecting joint that is uniformly tight; also a faster, easier and simpler installation.

Form 8-152

**Manufactured under U. S. patents, other patents pending*

Complete literature on Huck fasteners is available on request to:

Huck MANUFACTURING COMPANY
DETROIT , MICH.

for better output-

WEIRTON
STRIP STEEL

The better the strip, the better the product—and the easier production. Those are two important reasons why manufacturers find it advantageous to use Weirton cold-rolled strip steel. Its excellent drawing and forming qualities, its constant uniformity, promote plant efficiency and economy by reducing spoilage and tool expense. In short—Weirton strip boosts both quantity and quality.

WEIRTON STEEL COMPANY
WEIRTON, WEST VIRGINIA

NATIONAL STEEL CORPORATION

Spinning Specialists

COVER

FOR BOTTLING MACHINE

Gauge: .050—Type: 430 Stainless Steel—Dimension: 62½" I.D.

SPUN FROM ONE PIECE

Burnishing gives the final touch a smooth, impervious surface.

Spinning large units is admittedly a difficult operation but not for Craft. That is our Specialty in ANY metal, to ANY specifications.

We have the facilities, the craftsmen, and the experience. Submit your "trickiest" requirements, and let us prove to you how easily and inexpensively a tough job can be done.

WRITE FOR DESCRIPTIVE CIRCULAR OF FACILITIES AND PRICES

Craft METAL SPINNING CO.

EAST DUNDEE, ILLINOIS

SPINNING
ANNEALING
PICKLING
POLISHING

Symbol of Security—

Through the centuries, Chain has come to be a symbol of security and safety. And not without reason! The builders of cities, the producers of goods, the transporters of products—*all* depend on chain to help them do a better job at less cost.

If your operations involve hauling, lifting, towing, bundling or other material handling tasks—look to McKAY CHAIN. There are hundreds of McKAY CHAINS and Assemblies especially designed to do most of these jobs efficiently, easily and economically.

McKAY CHAIN
for Every Use

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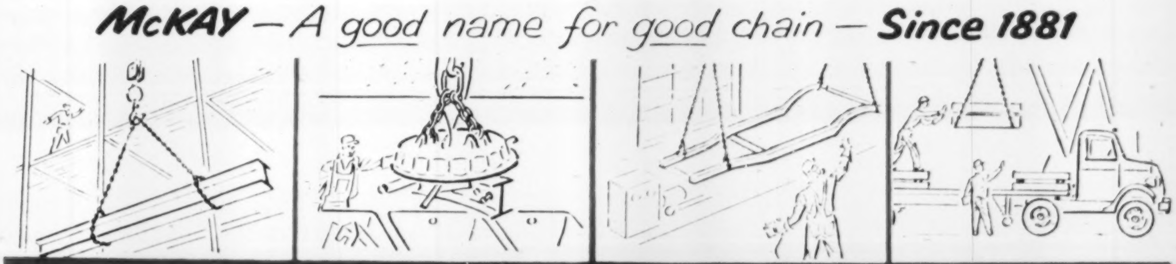
McKAY** — A good name for good chain — **Since 1881



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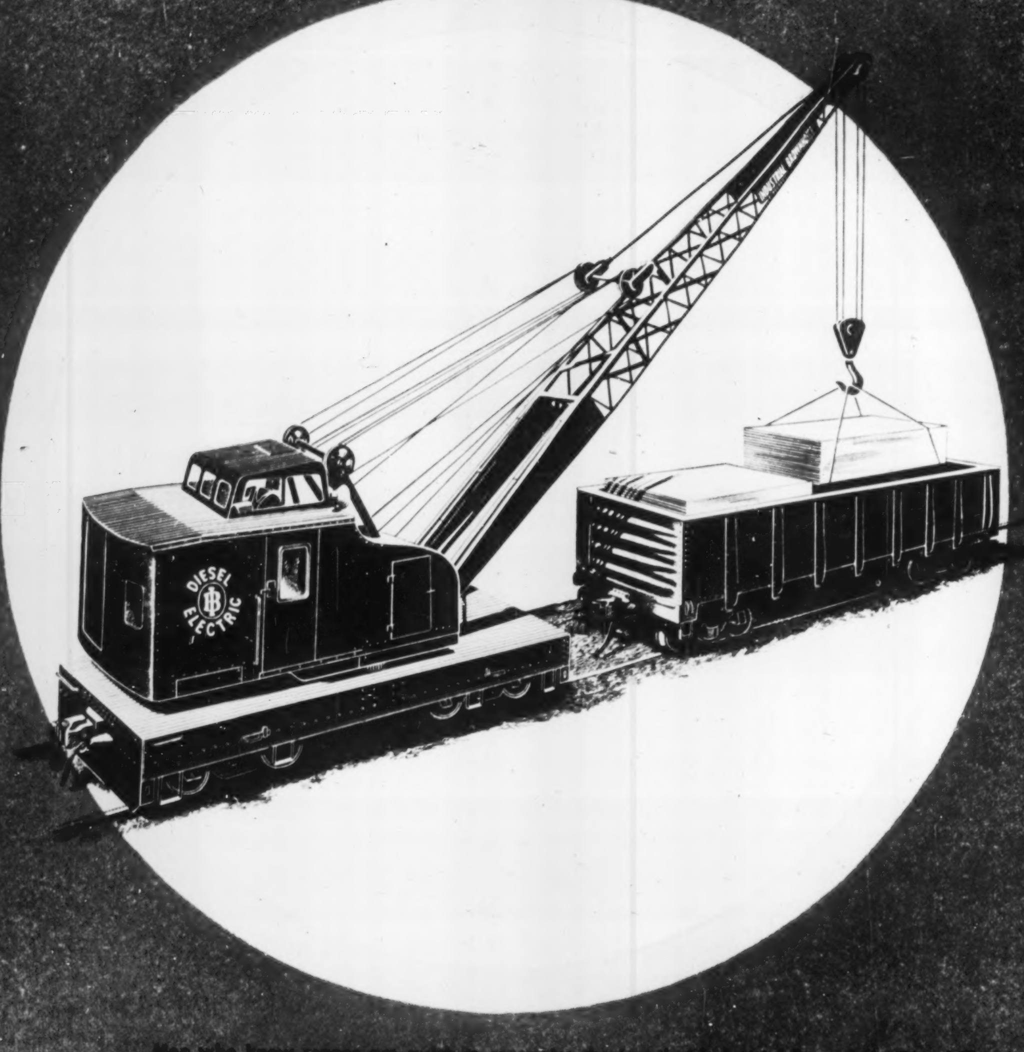
BROWNHOIST Diesel Electric Cranes save time, save labor, save money



Men who know cranes are quick to recognize the fact that Industrial Brownhoist Diesel Electric Locomotive-Cranes provide savings in man-hours, production time and money. Brownhoist Cranes, powerful, efficient units with high tractive power and rapid acceleration, give top performance as a switch engine or as a crane operating magnet, hook or bucket. The patented Monitor-Type Cab and Clear Vision Boom permit unlimited 360° visibility that helps the operator safely turn out a greater volume of work. The simplified design and accessibility of the moving parts make Brownhoist Cranes easy to maintain and repair. Brownhoist builds Locomotive-Cranes in capacities from 25 to 50 tons.

Write today for complete information.

155

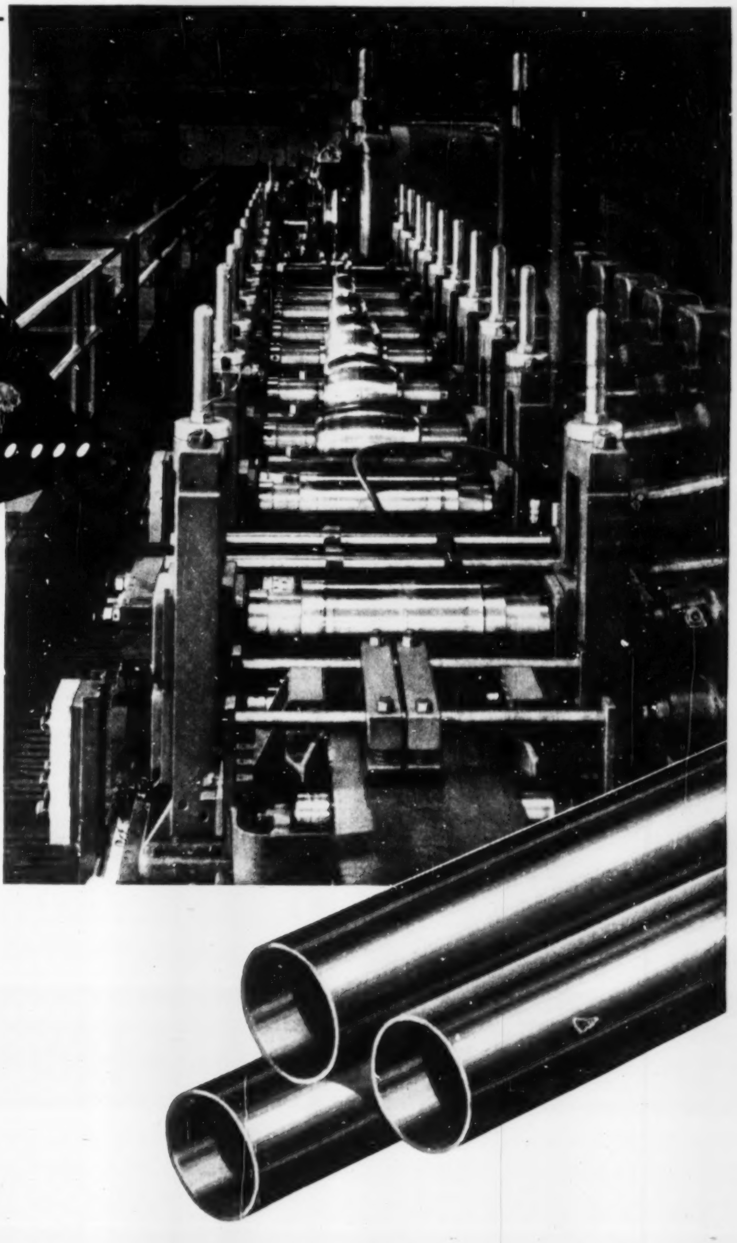
CLAMSHELL BUCKET
250 TON WRECKING CRANE
COAL-ORE BRIDGE

BROWNHOIST
builds better cranes

INDUSTRIAL BROWNHOIST CORPORATION, BAY CITY, MICHIGAN · DISTRICT OFFICES: New York, Philadelphia, Cleveland, San Francisco, Chicago. Canadian Brownhoist, Ltd., Montreal, Quebec · AGENCIES: Detroit, Birmingham, Houston

One of several YODER TUBE MILLS recently installed by leading Auto Manufacturers—

The Choice of a TUBE MILL....



may be governed by a great many factors such as first cost, operating cost, speed, capacity, power consumption, etc. Mechanical and electrical features of the tube forming, sizing and welding units in themselves must be carefully examined. However, no matter how necessary or important all such details may be—or how effectively they may be presented—the most convincing proof of superiority is obtained by a comparison of tonnage production, consistently maintained over the years, of high quality tubes.

Fortunately, most electric weld tube mills are chosen that way. This fact, above all others, explains why the vast majority of such mills installed in the U.S.A. are built by Yoder.

List of Yoder tube mill installations sent on request. Also literature discussing the economics as well as the mechanics of tube making.

THE YODER COMPANY
5502 Walworth Avenue • Cleveland 2, Ohio

Complete Production Lines

- ★ **COLD-ROLL-FORMING** and auxiliary machinery
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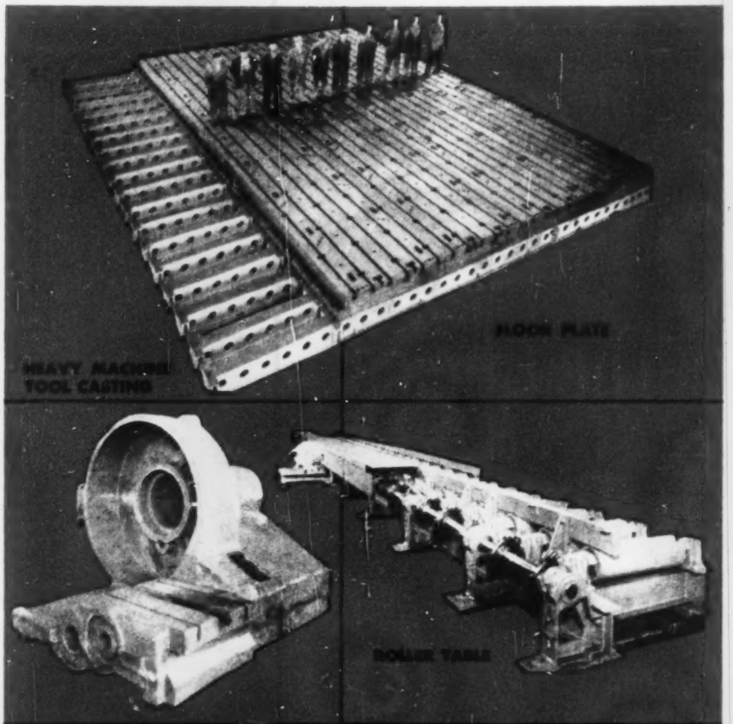
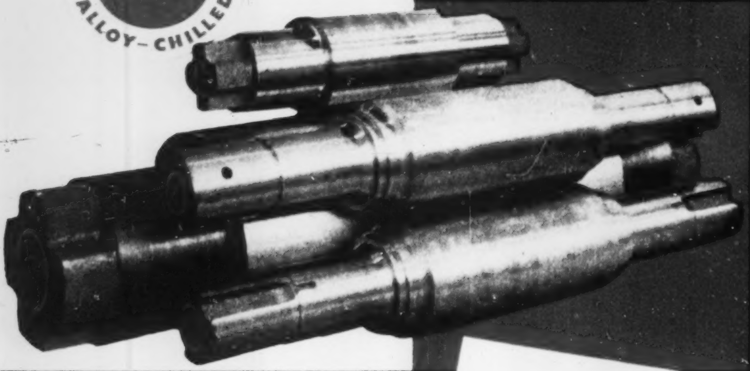
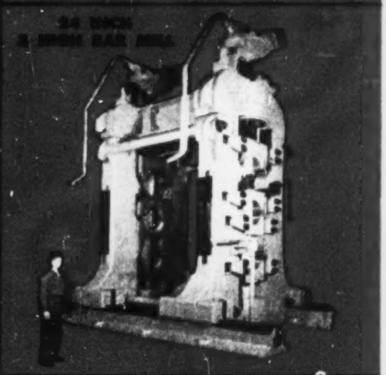
YODER
MANUFACTURING

Hyde Park ROLLS and ROLLING MILL EQUIPMENT


HEAVY MACHINE TOOL CASTING
FLOOR PLATE
ROLLER TABLE

RED CIRCLE
Rolls
ALLOY-CHILLED




24 INCH 3 HIGH BAR MILL

The Red Circle is the Hyde Park mark of quality.

You will never find it on an unworthy roll, nor on any but the best and most dependable roll of its type. It is symbolic of the high integrity and efficient performance of all Hyde Park Rolling Mill Equipment.

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Alloy Iron • Chilled • Sand

ROLLING MILL EQUIPMENT

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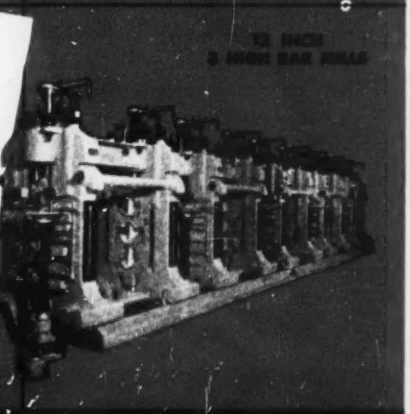
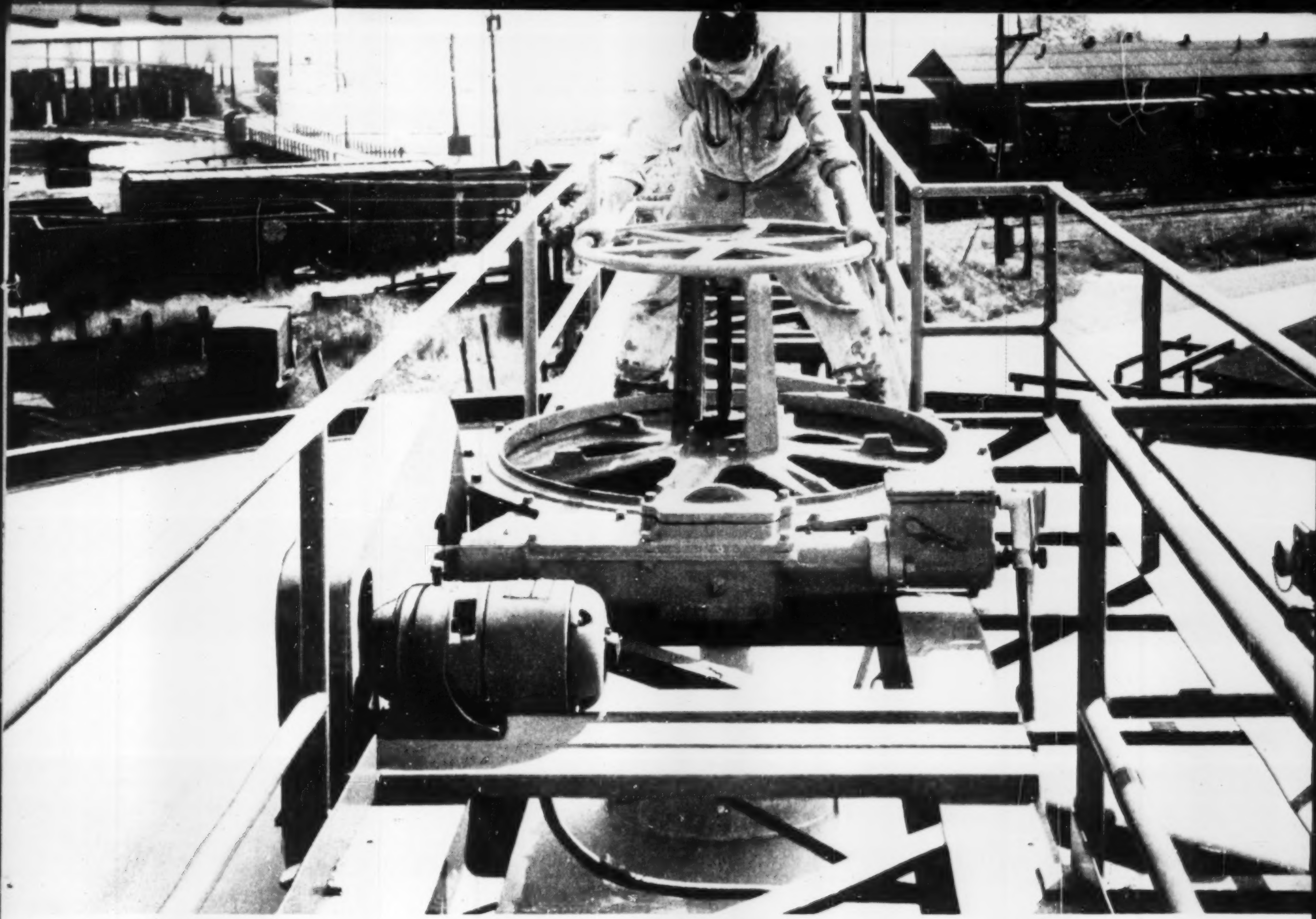

12 INCH 3 HIGH BAR MILLS

Hyde Park FOUNDRY & MACHINE CO.

HYDE PARK, WESTMORELAND COUNTY, PITTSBURGH DISTRICT, PA.



THIS G-E GEAR-MOTOR WAS PICKED TO RUN A SLUDGE ACCUMULATOR 24 HOURS A DAY AND 7 DAYS A WEEK BECAUSE . . .

New G-E Gear-motor Reduces "Down-time"

Easy stator removal, use of Tri-Clad* motors, cuts maintenance costs and time more than 50%.

G-E Gear-motors are single units—compact and efficient the most economical method of gear reduction for low-speed drives. This year, they have been redesigned to offer you additional operating economy.

EASY STATOR REMOVAL is now possible without disturbing the gear-train in any way. Also, any standard G-E motor with or without feet may be used as a stator replacement. These advantages mean a reduction of nonproductive "down-time" and substantial cost savings!

TRI-CLAD MOTORS are now an integral part of every G-E Gear-motor. These are the same motors which have gained such a wide acceptance throughout industry the motors which assure you of extra reliability triple protection against physical damage, electrical breakdown, and operating wear and tear.

A new stocking plan keeps most popular ratings available on a 1-week basis. You can order your gear-motor from your nearest G-E Apparatus Sales Office or your Authorized G-E Agent or Distributor. General Electric Company, Schenectady 5, N. Y.

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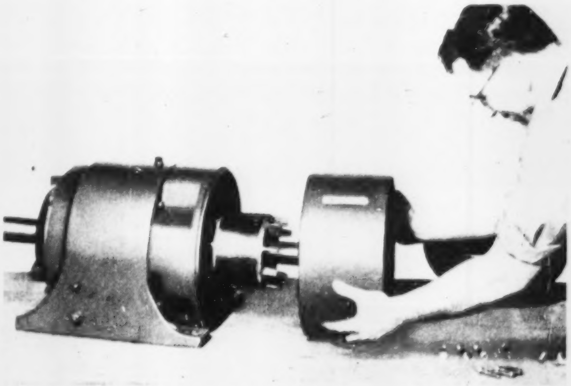
*Registered Trade-mark of General Electric Company

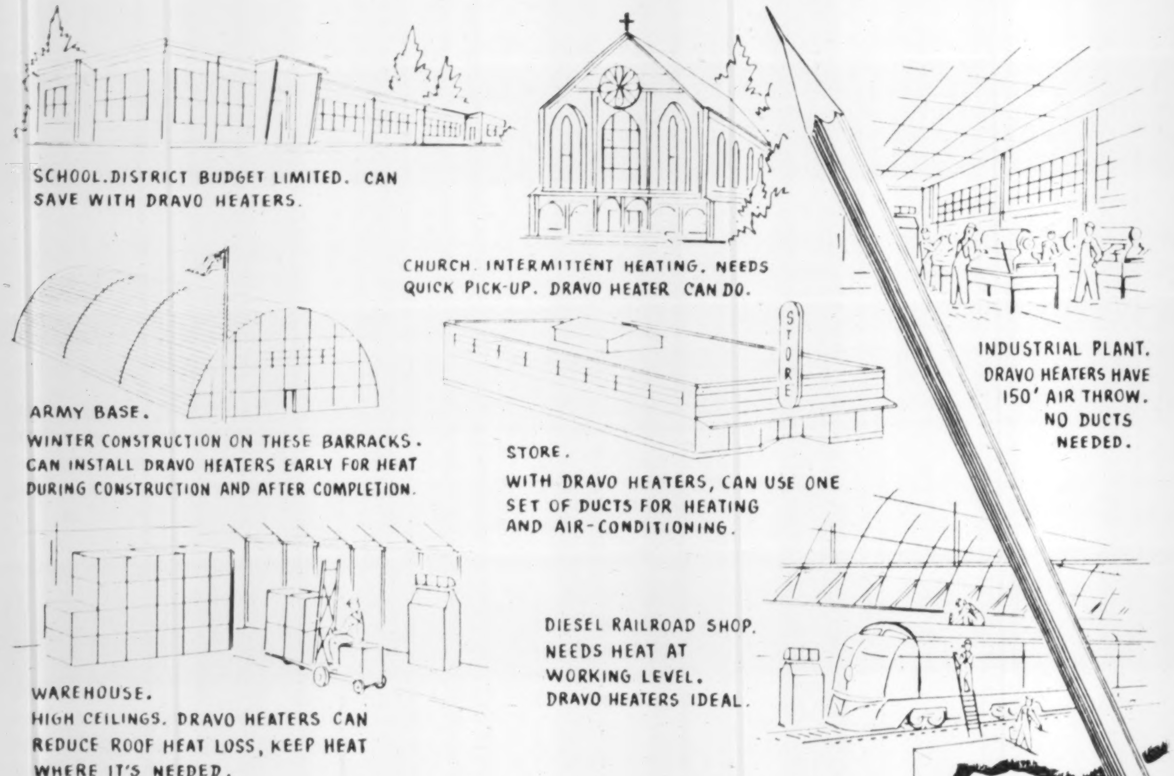


Rabbet fit between stator and gear-motor frame assures positive realignment. Note that stator removal is simply a matter of removing a few bolts can be done without disturbing gear-train.

GENERAL GE ELECTRIC

NOTES FROM AN ENGINEER'S SKETCH PAD

LOOKS LIKE THAT VERSATILE DRAVO "COUNTERFLO" HEATER CAN BE USED ON PRACTICALLY ALL OUR JOBS.



SCHOOL. DISTRICT BUDGET LIMITED. CAN SAVE WITH DRAVO HEATERS.

CHURCH. INTERMITTENT HEATING. NEEDS QUICK PICK-UP. DRAVO HEATER CAN DO.

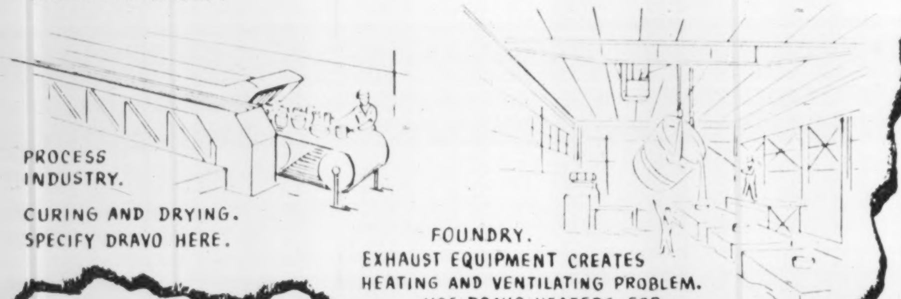
INDUSTRIAL PLANT. DRAVO HEATERS HAVE 150' AIR THROW. NO DUCTS NEEDED.

ARMY BASE.
WINTER CONSTRUCTION ON THESE BARRACKS. CAN INSTALL DRAVO HEATERS EARLY FOR HEAT DURING CONSTRUCTION AND AFTER COMPLETION.

STORE.
WITH DRAVO HEATERS, CAN USE ONE SET OF DUCTS FOR HEATING AND AIR-CONDITIONING.

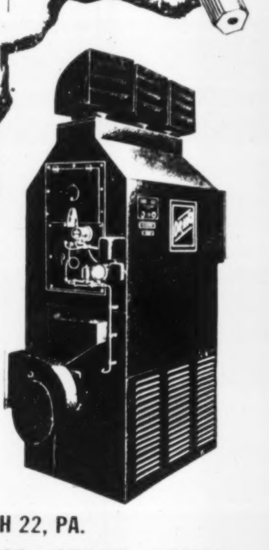
WAREHOUSE.
HIGH CEILINGS. DRAVO HEATERS CAN REDUCE ROOF HEAT LOSS, KEEP HEAT WHERE IT'S NEEDED.

DIESEL RAILROAD SHOP.
NEEDS HEAT AT WORKING LEVEL. DRAVO HEATERS IDEAL.



PROCESS INDUSTRY.
CURING AND DRYING. SPECIFY DRAVO HERE.

FOUNDRY.
EXHAUST EQUIPMENT CREATES HEATING AND VENTILATING PROBLEM. USE DRAVO HEATERS FOR TEMPERED "MAKE-UP" AIR.



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A case study on any installations is yours for the asking. For complete information on how Dravo "Counterflo" Heaters can help solve your heating problems, write for Bulletin LM- 26-3546.

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HEATING DEPARTMENT, DRAVO BUILDING, PITTSBURGH 22, PA.

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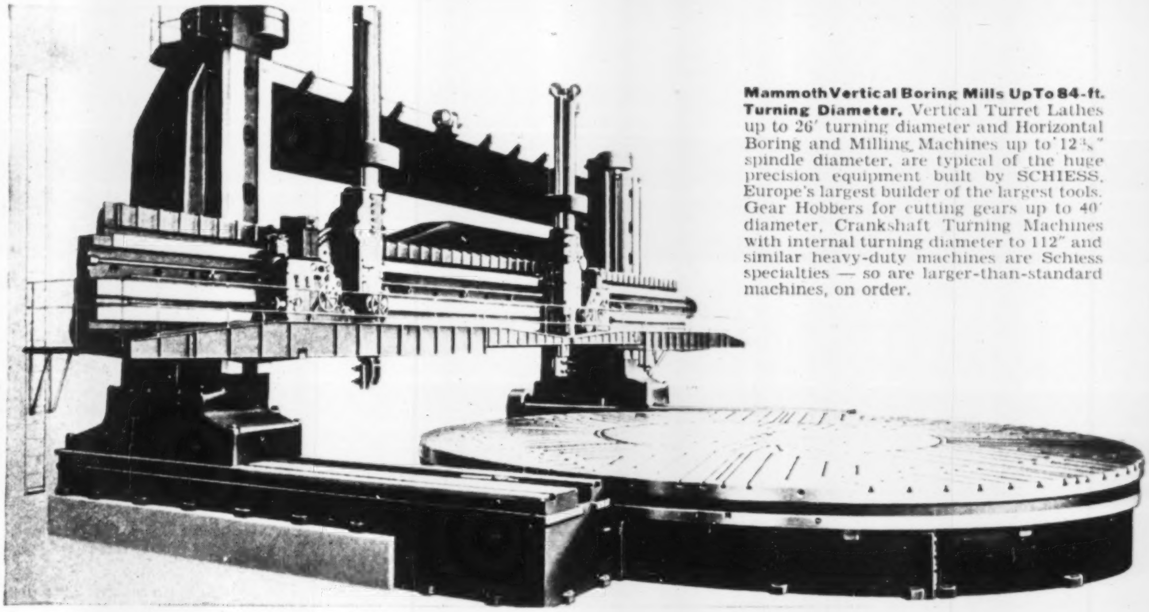
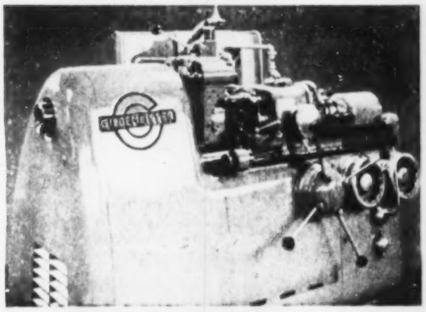


Mammoth Vertical Boring Mills Up To 84-ft. Turning Diameter, Vertical Turret Lathes up to 26′ turning diameter and Horizontal Boring and Milling Machines up to $12\frac{3}{8}$" spindle diameter, are typical of the huge precision equipment built by SCHIESS, Europe's largest builder of the largest tools. Gear Hobbers for cutting gears up to 40′ diameter, Crankshaft Turning Machines with internal turning diameter to 112" and similar heavy-duty machines are Schiess specialties — so are larger-than-standard machines, on order.

THESE "WHAT'S AHEAD" MACHINE TOOLS ARE AVAILABLE NOW



16-station Vertical Drum-Type Turret Lathe with automatic preselection and cycling of feeds, speeds and rotation direction for each tool. GILDEMEISTER RV 50 reduces set-ups and eliminates second and third operations; cuts machining time up to 50%, on many special jobs. Speeds 11-2000 rpm. Bar feeds 1-9/16", 2", $2\frac{1}{2}$".

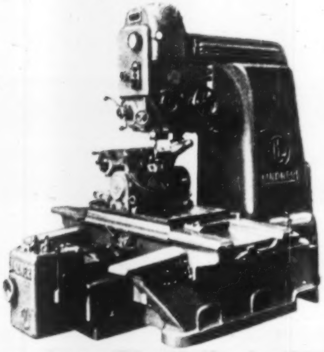
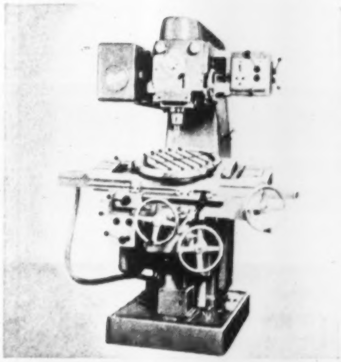


Table settings accurate within .000157"; readings in .00004" in the LINDNER JIG BORERS. Direct-reading optical measuring system is free from mechanical wear. Accurate adjustment is permanent. Longitudinal and transverse table movements 40" x 24" and 24" x 16".



Vertical milling, downfeed milling and jig boring in one set-up on the HURTH. For precision machining of jigs, dies, gages, fixtures and similar close-limit tooling. Gage block measuring system on table. Table sizes: 48" x $13\frac{3}{4}$", $39\frac{1}{4}$" x $11\frac{3}{4}$" and $34\frac{1}{4}$" x $10\frac{1}{2}$".

...and advanced machining methods like these...

Faster back-up turning without complicated tables for machine settings on REINECKER RELIEVING LATHE.

Transverse, vertical, bevel and longitudinal planing in one set-up on toolroom work as large as $14\frac{3}{4}$′ x $9\frac{1}{6}$′ x $32\frac{1}{2}$′ on WAGNER DOUBLE-COLUMN PLANER.

Lead and pitch tolerances within .00008" in traverse and plunge grinding with LINDNER THREAD GRINDERS. Two sizes: center distance $15\frac{3}{4}$" and $31\frac{1}{2}$".

Only machine designed for down-cut or climb milling of high tensile steels. JERWAG principle cuts machining time, produces accurate, uniform finish. Table 55" x 14".

Twist drill life increased 10 times by CAWI GRINDER planetary gear system. For wet or dry grinding drills 1/16" to 1" diameter.

All Orban-imported tools are serviced by factory-trained engineers at our Service Centers. Replacement parts in stock.

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LINDE'S News of Metalworking

New Machine Carriage Saves Time On Many Jobs

A new machine carriage in the low-priced field does dozens of metalworking jobs and does them more quickly, accurately, and uniformly than the most skilled hands. This machine, the Oxweld CM-45, handles practically all machine carriage requirements in small metalworking shops, and supplements heavier equipment in larger plants, shipyards, and mills.

Used on track, the CM-45 is ideal for accurate straight line cutting. It also cuts top or bottom bevels at practically any angle. With standard radius rods, it cuts circles with diameters of from 2 to 54 inches. To cut larger circles, a longer radius rod can easily be substituted.

Flame-treating work—be it flame-hardening, flame-softening, or low-temperature stress relieving—requires precisely controlled heat. With the CM-45 and appropriate heating apparatus, you get just that; thus you can be sure that each of your flame-treating jobs will be done uniformly.

These are only a few of the jobs that the Oxweld CM-45 Machine Carriage will do for you. Many additional cutting, welding, and heating applications will be suggested by the requirements of your own shop.

The CM-45 saves you time, not only because it does each job efficiently, but also because it is so easy to set up and operate. There is no complicated machinery to master. Its simple design makes it easy to adjust or repair. All parts are readily accessible.

Operating controls consist of a speed-control dial that can be preset or adjusted at any time, and a two-position clutch lever. All controls are grouped together at the rear of the machine for your convenience.

Since the machine weighs only 33½ lb. complete with cutting blowpipe (as shown in Fig. 1), it's an easy, one-man job to move it from one section of your shop to another. The machine's compactness also makes it convenient for use in close quarters where larger machines cannot be used.

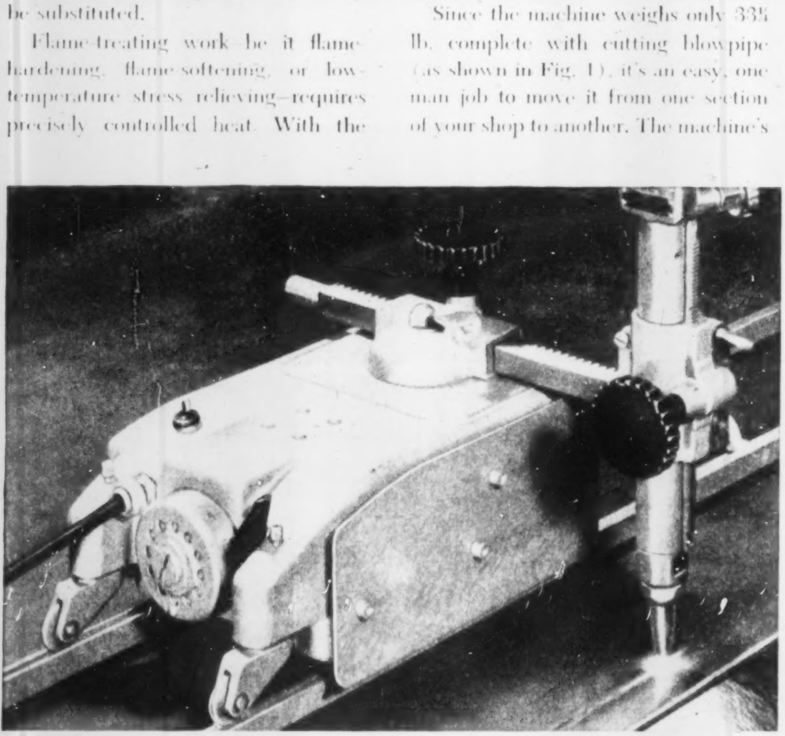

Fig. 1 Cut straight lines or bevels in plate or other steel forms. For all the CM-45's many jobs, a stepless speed range of 4 to 32 in. per min. is available.

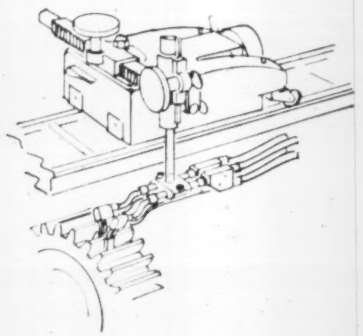

Fig. 2 Flame-treating work requires precise control of applied heat. The CM-45, with suitable apparatus, assures you of efficiency and uniformity on every job.

Any Linde representative will gladly show you how the Oxweld CM-45 Machine Carriage will help you turn out more work in less time. Call the nearest Linde office today for a free demonstration.

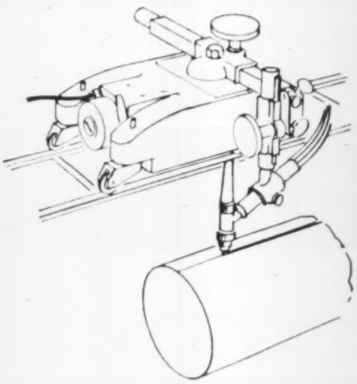

Fig. 3 Do special welding jobs, such as tube fabrication, quickly with the CM-45. Rejects are reduced to a minimum.

The terms "Linde" and "Oxweld" are registered trade-marks of Union Carbide and Carbon Corporation.

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A Division of Union Carbide and Carbon Corporation

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PRE-CHECKED HARDNESS PROVES EXTRA WEAR IN

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Grueling . . . rugged shock loads . . . day-in day-out poundings on the roughest drives—Atlas Roller Chain has the pre-tested, proven toughness to take them all. Longer trouble-free production for you is proved by repeated Rockwell Hardness Tests of every important part of Atlas Chain. The toughness that gives greater strength and wear resistance . . . built in by the exclusive Atlas hardening process . . . is scientifically checked and re-checked. Result . . . ruggedness for every drive . . . smoothness for positive power.

The pre-tested toughness of Atlas Roller Chain lets it take a beating, stand up longer. That means lower maintenance and fewer replacements, greater production and higher profits.

For full rated speeds on all your machines, under any operating condition, install Atlas "Super-Life" Roller Chain—the chain with the extra stamina. Write today for the new Catalog and Handbook on Atlas Chain.

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MORE TIME

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LESS TIME ON REPAIRS

You can keep steel-mill machinery on the job longer by using HAYNES hard-facing alloys to protect wearing parts. With hard-faced parts, you will have less down time and fewer repairs—more time for steelmaking. Illustrated here are some typical savings that have been made.

If you would like a copy of our hard-facing manual, which gives further information on the use of HAYNES hard-facing alloys, fill out the coupon below and mail it to us. For on-the-job help, get in touch with our nearest district office.

1 A yearly application of HAYNES STELLITE alloy No. 1 on this mud-gun screw for blast-furnace tap holes has eliminated monthly maintenance.

2 HAYNES STELLITE alloy No. 6 on the points of soaking-pit tongs has increased their life 19 times. Some hard-faced tongs have lasted as much as 50 times longer than unprotected ones.

3 The life of blooming mill shears has been increased 10 times by applying HASTELLOY alloy C on the cutting edge.

4 Entry guides for a bar-reduction mill used to wear out after handling 40 tons of steel. Guides hard-faced with HAYNES STELLITE alloy No. 6 last 4 to 5 times longer than unprotected ones.

5 Three years ago, some cone rollers in this bar-cooling bed were faced with HAYNES alloy No. 92. They are still in service.

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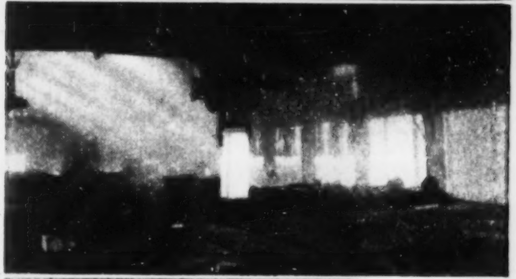

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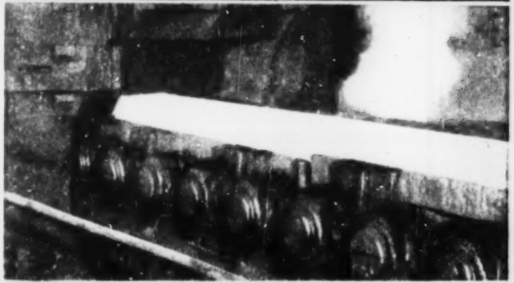

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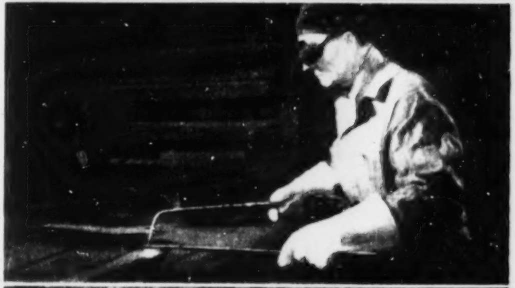

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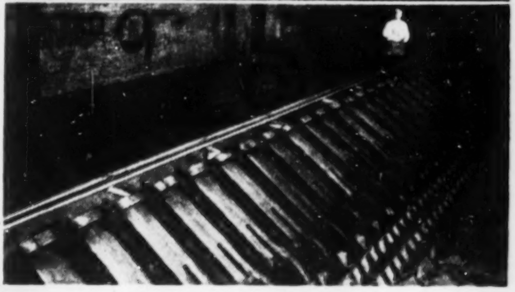

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MILL DRIVES — Specially designed to suit individual requirements, Farrel reduction gear drives, pinion stands and combination units are built in any size for any capacity. Combination units have the reduction gears and pinions in a compact, integral housing.

ROLL GRINDERS — Available in two types and nine standard sizes, Farrel roll grinders enable you to fix and maintain definite standards of accuracy and finish. Rolls are produced with a flawless surface, free from marks of any kind, ground straight, or with concave or convex contours of exact symmetry and accuracy.

Information and engineering consultation available, without obligation.

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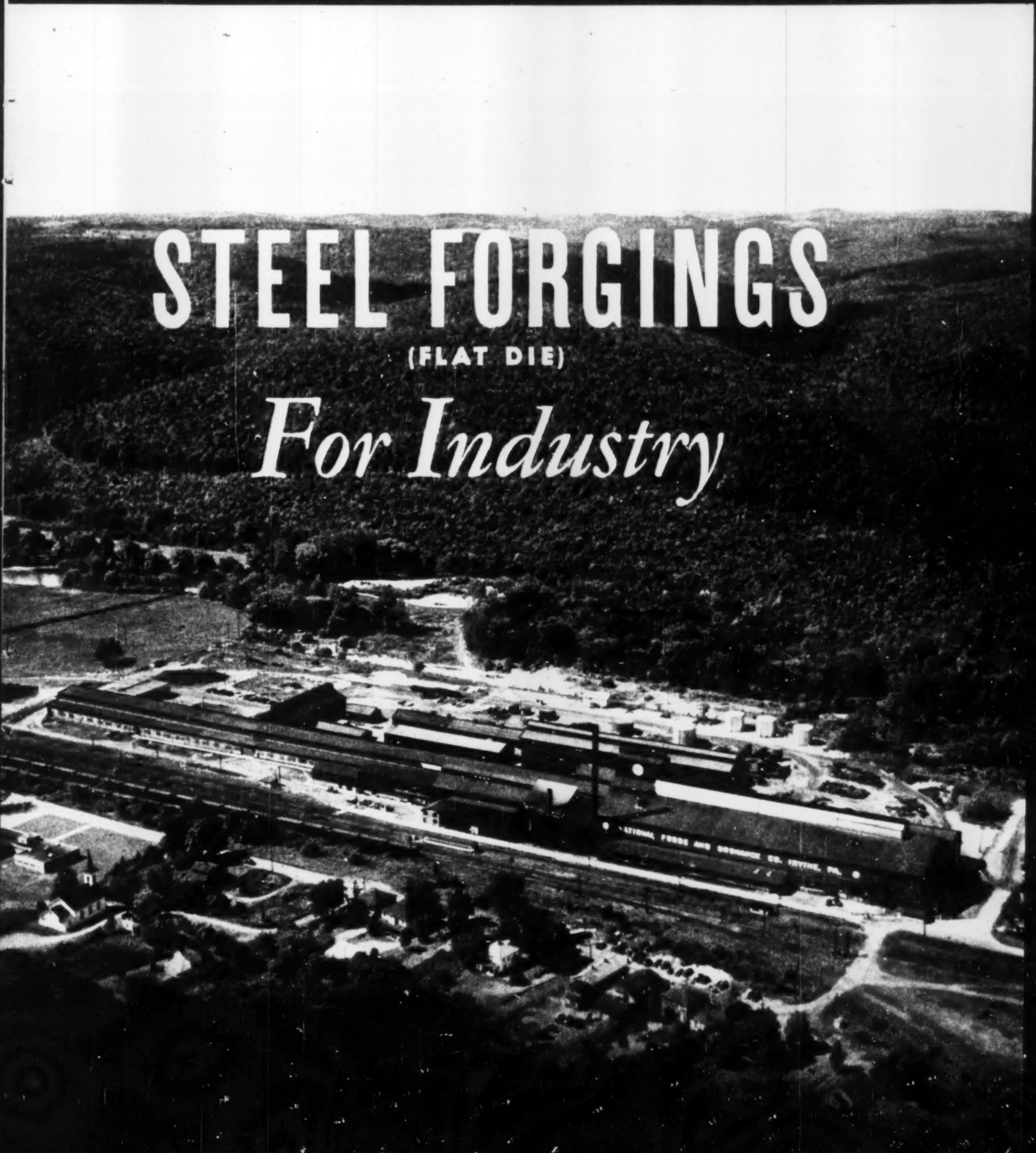
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NATIONAL FORGE AND ORDNANCE COMPANY

IRVINE, WARREN COUNTY, PENNSYLVANIA

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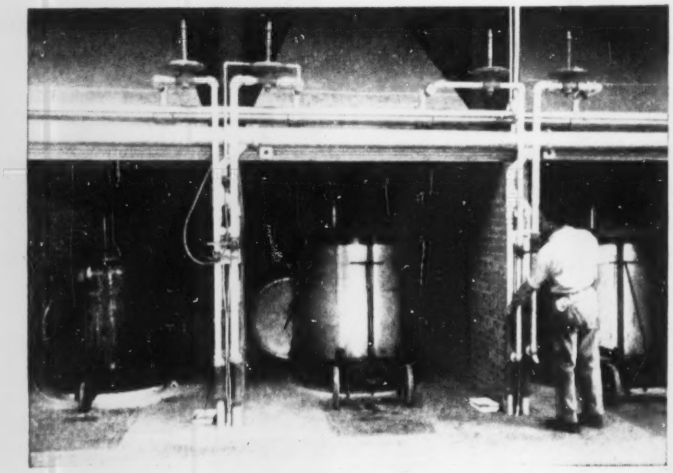
. . . THE MODERN FUEL FOR ALL INDUSTRY

conversion to GAS for Varnish processing

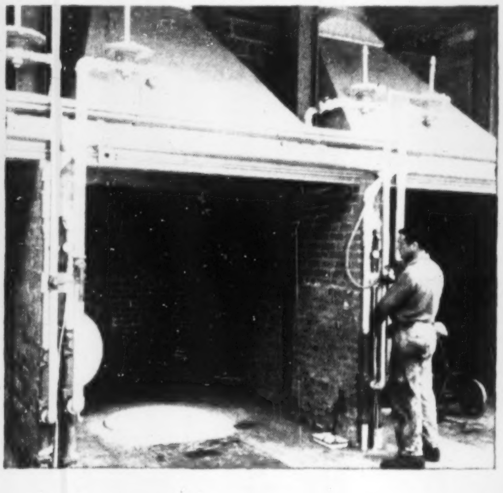
Increased Production 50%

at AMERICAN LITHOGRAPHIC VARNISH COMPANY, INC.
Kearny, New Jersey



THIS BATTERY OF SELAS GAS BURNERS provides precise temperature control, and has brought about a marked improvement in cleanliness and consequently in working conditions.

AMERICAN LITHOGRAPHIC VARNISH COMPANY, INC. installed this Modern Gas Equipment in 1949 for heat bodying and treating of various oils.



When the officials of American Lithographic Varnish Company converted to Gas:

1. **They increased production 50% at no increase in unit cost.**
2. **They obtained precise temperature control of process.**
3. **They greatly increased cleanliness of operation.**

MORE AND MORE
THE TREND IS TO GAS

GAS IS THE MODERN FUEL FOR INDUSTRY because Gas Equipment is simple to operate, needs no expensive accessory equipment, allows precise temperature control; Gas is clean, economical, and versatile. Check the facts on Modern Industrial Gas Equipment with your Gas Company Representative today.

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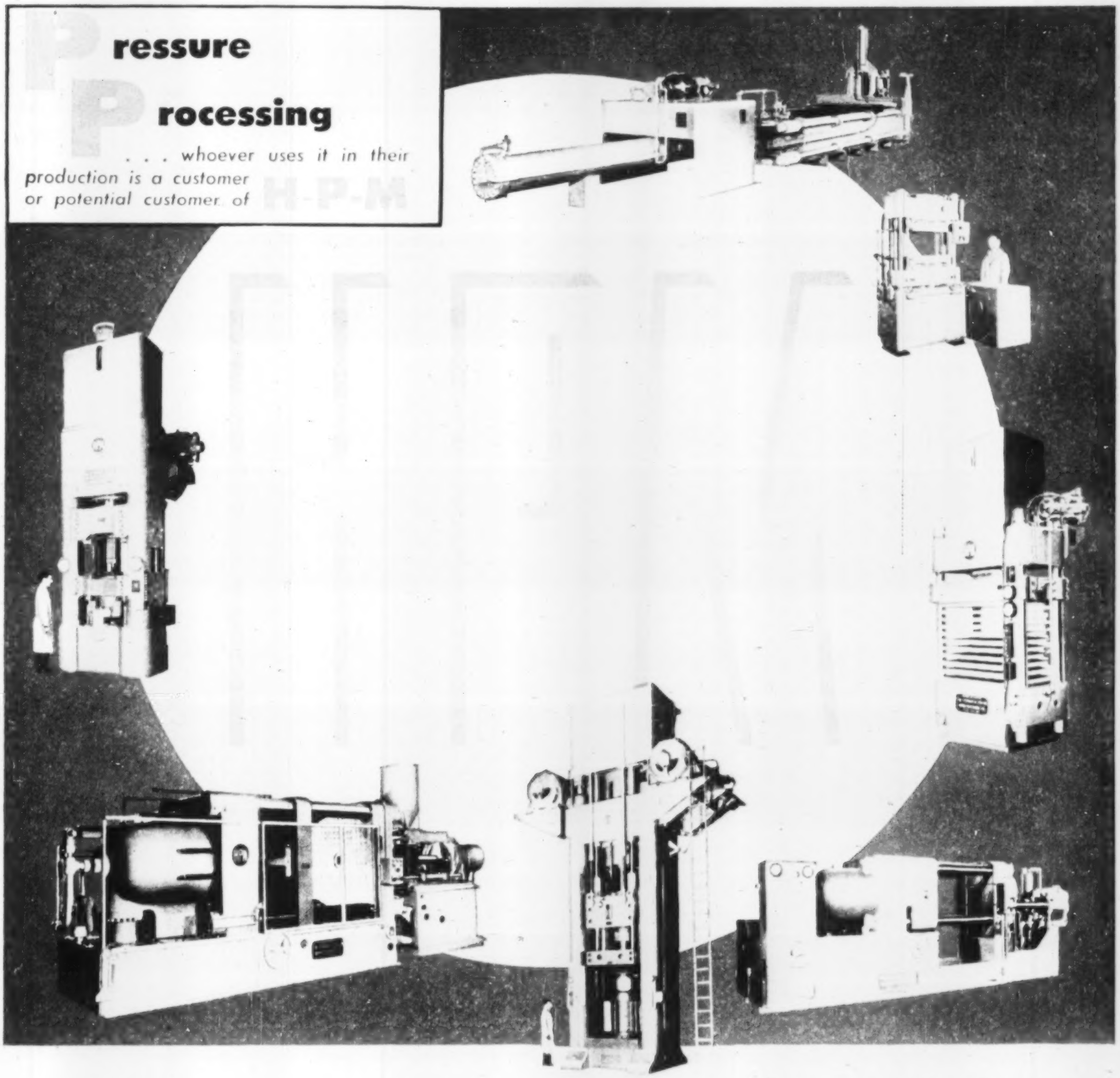


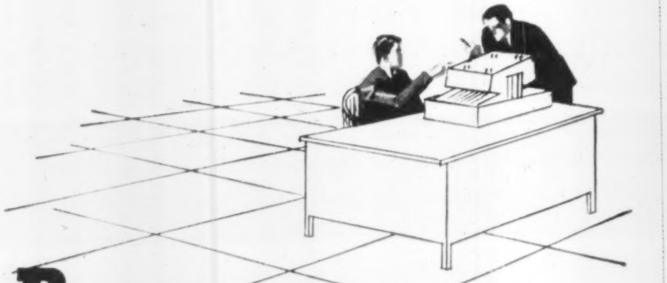
Pressure Processing

. . . whoever uses it in their production is a customer or potential customer of H-P-M

■ Metalworking . . . Die Casting . . . Rayon Steeping . . . Briquetting . . . Laminating . . . and Plastics Injection, Compression and Transfer Molding are just a few modern production jobs being handled faster and better today because of H-P-M All-Hydraulic Presses. Call in an H-P-M engineer to study your production. Perhaps he can save you real money. Write today!

HPM **THE HYDRAULIC PRESS MFG. CO.**

1044 Marion Road, Mount Gilead, Ohio, U. S. A.



Banishes warping... eliminates grinding for Stainless Tank Producer

PROBLEM: Unusually severe warpage and the need for extensive grinding of welds resulted in a poor-looking job and excessive costs for a Philadelphia metal products company making stainless steel tanks for photographic developing. Tanks were of 16 ga. sheet, 48" x 36"—sides were bent up 90°, 18" inward from each edge to leave a 12" bottom—ends were being tacked in place and arc welded with 3/32" electrodes at 70 amps.

SOLUTION: M&T's district welding salesman—after studying the production set-up—

(1) Recommended use of inert-arc welding instead of metallic arc welding

(2) Designed and helped build a water cooled copper jig. Tanks could then be fabricated by placing them upside down on the jig, clamping an end in place, and starting to weld at the upper left hand corner, continuing across to right hand corner—and down to the right side. The left side was then welded from the top down. Next, the tank was turned around and the same procedure was repeated on the other end. 1/16" tungsten at 40 amps DC were used for welding.

RESULT: Warpage eliminated—grinding unnecessary—clean, flat, *almost invisible* welds obtained—costs brought into line.

Your nearby M&T representative is qualified to give you genuine assistance on any welding problem. Call on him when you need help. Make use of his broad background of experience in every phase of welding.

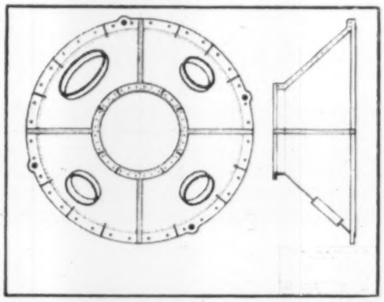
MUREX®

Electrodes

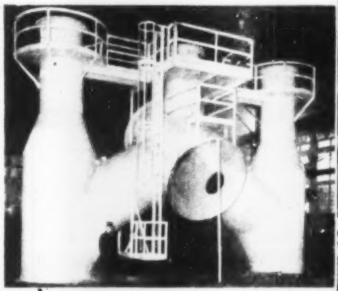
Arc Welders • Accessories

METAL & THERMIT CORPORATION 100 East 42nd Street, New York 17, N. Y.

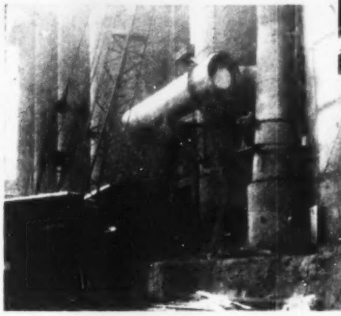
POLLOCK



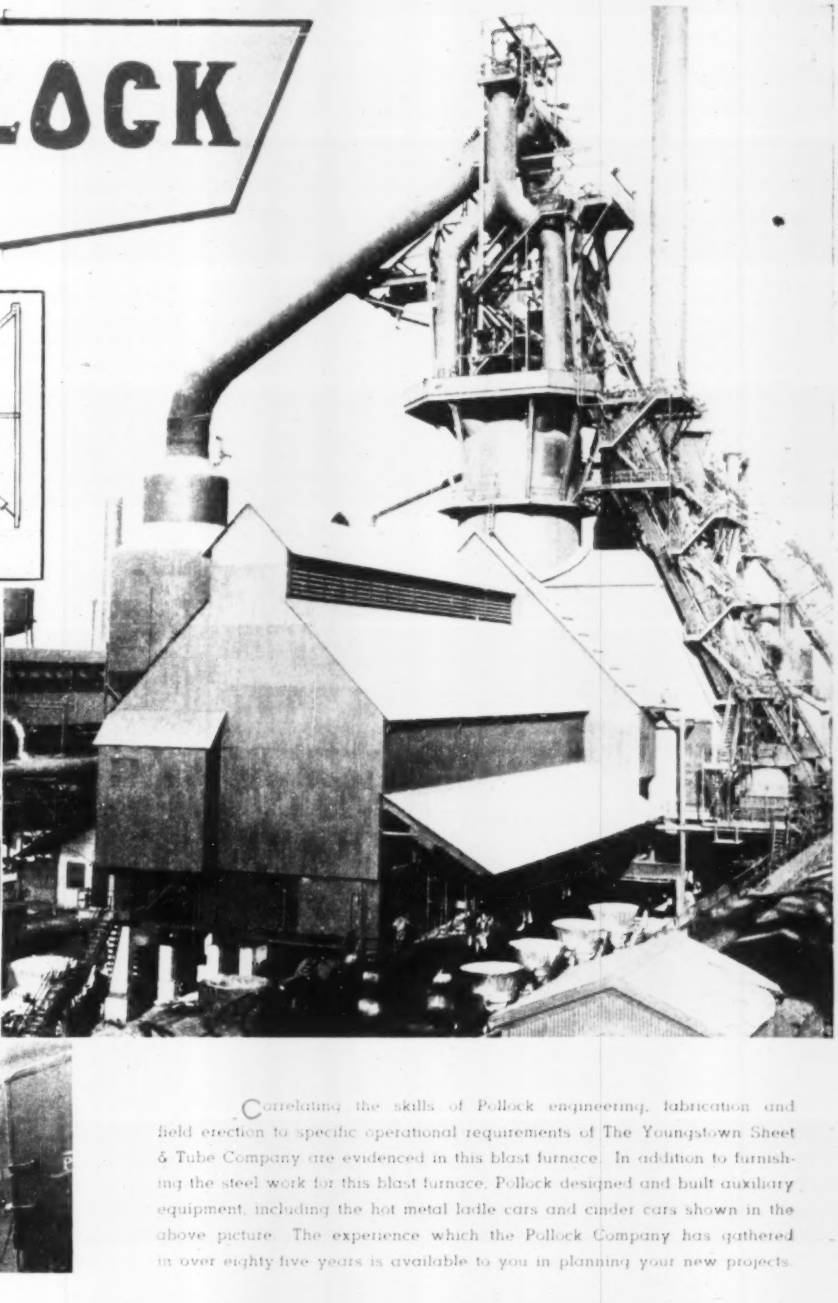
ENGINEERING



SHOP FABRICATION



FIELD ERECTION



Correlating the skills of Pollock engineering, fabrication and field erection to specific operational requirements of The Youngstown Sheet & Tube Company are evidenced in this blast furnace. In addition to furnishing the steel work for this blast furnace, Pollock designed and built auxiliary equipment, including the hot metal ladle cars and cinder cars shown in the above picture. The experience which the Pollock Company has gathered in over eighty-five years is available to you in planning your new projects.

Blast furnace STEEL WORK

POLLOCK

THE WILLIAM B. POLLOCK COMPANY
YOUNGSTOWN · OHIO
STEEL PLATE CONSTRUCTION · ENGINEERS · FABRICATORS · ERECTORS

BLAST FURNACES · HOT METAL CARS AND LADLES · CINDER AND SLAG CARS · INGOT MOULD CARS · CHARGING BOX CARS · WELDED OPEN HEARTH LADLES

NEW

DODGE-TIMKEN ALL-STEEL PILLOW BLOCKS

HEAVY DUTY CAPACITY!

LESS SPACE! LESS WEIGHT!

A JOINT ENGINEERING DEVELOPMENT BY DODGE AND THE TIMKEN ROLLER BEARING COMPANY

- All-Steel construction
- A new Timken bearing design
- High radial and thrust capacities
- Compact—minimum dimensions
- Minimum weight with maximum strength
- Fully self-aligning with spherical outer race
- Both expansion and non-expansion types
- Adapter mounting, proven through the years
- Double piston ring seals
- Sealed both on and off the shaft
- Fully assembled, permanently adjusted, lubricated and sealed at the factory

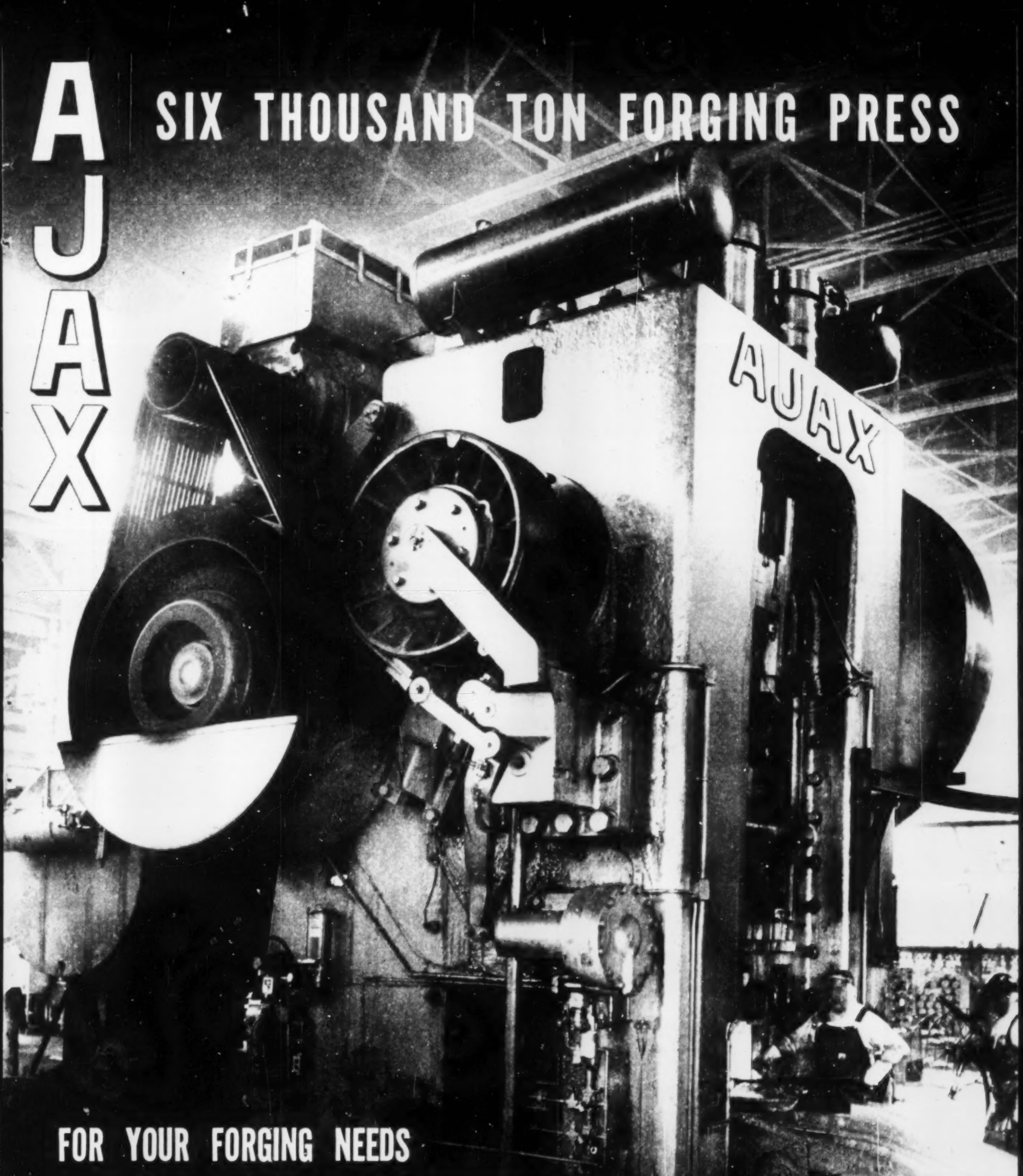
Here are the bearings for industry's toughest jobs. High radial and thrust capacities. Stamina to take heavy shock loads. And all-steel construction packs this load-carrying capacity into less weight and less space. Engineers are already specifying "Dodge-Timken All-Steel" for some of America's largest projects. Write for details and delivery dates, or call your Dodge Distributor.

DODGE MANUFACTURING CORPORATION
4400 Union Street, Mishawaka, Indiana

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new cost saving methods. Look for his name under "Power Transmission Equipment" in your classified phone book.

DODGE
of Mishawaka, Ind.

NAME PLATES · FOR YOUR NAME PLATE REQUIREMENTS, WRITE OUR SUBSIDIARY, CHICAGO THRIFT-ETCHING CORPORATION, 1555 SHEFFIELD AVENUE, CHICAGO 22, ILLINOIS



AJAX

SIX THOUSAND TON FORGING PRESS

FOR YOUR FORGING NEEDS
A COMPLETE LINE OF FORGING PRESSES
FIVE HUNDRED TO SIX THOUSAND TONS CAPACITY

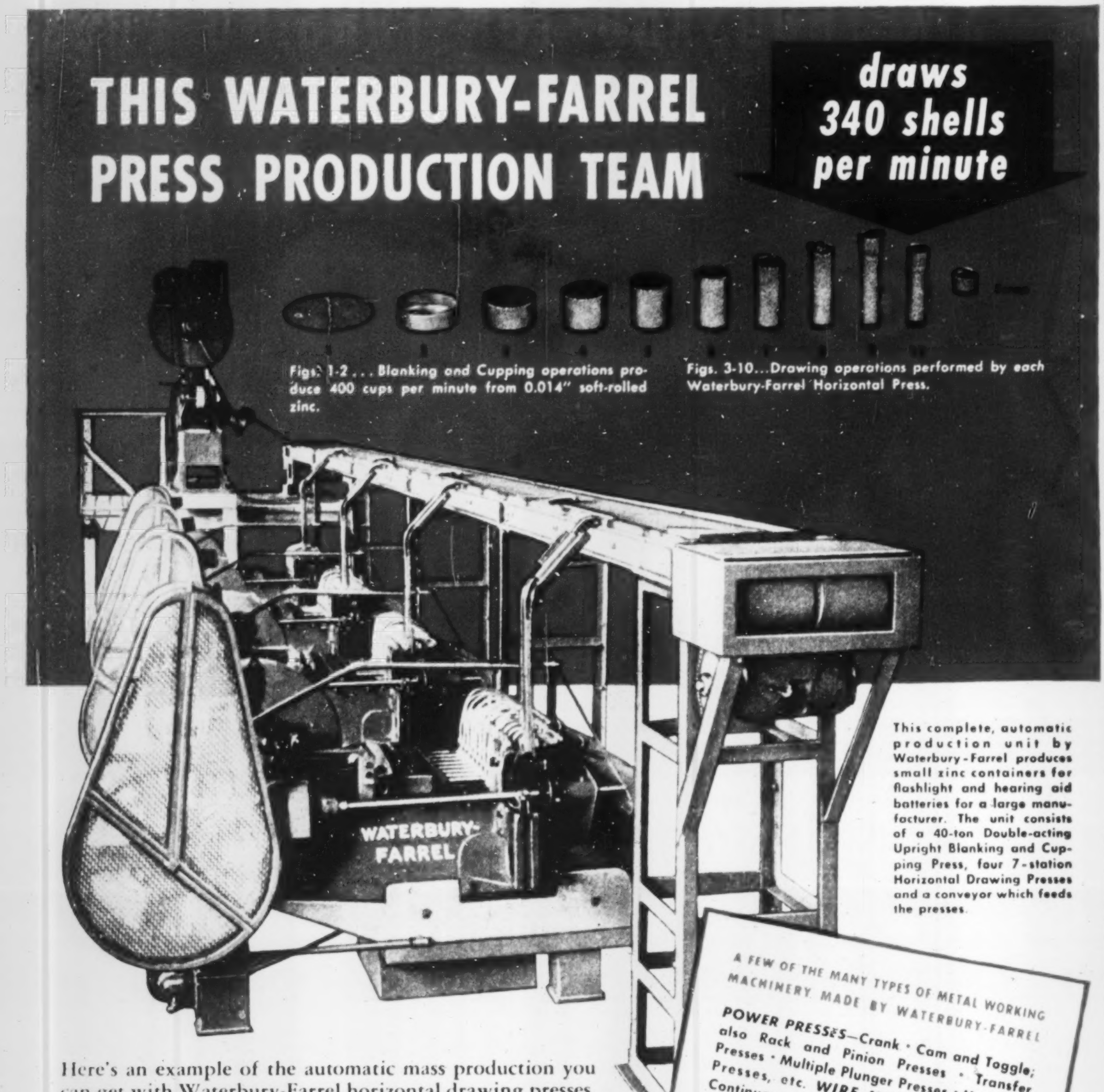
MANUFACTURED BY THE AJAX MANUFACTURING COMPANY

WRITE FOR BULLETIN 75B

EUCLID BRANCH P. O. CLEVELAND, OHIO • 110 S. DEARBORN ST. CHICAGO, ILL. • DEWART BLDG. NEW LONDON CONN.
FOREIGN AGENTS IN PRINCIPAL COUNTRIES OF THE WORLD

THIS WATERBURY-FARREL PRESS PRODUCTION TEAM

draws 340 shells per minute



Figs. 1-2 . . . Blanking and Cupping operations produce 400 cups per minute from 0.014" soft-rolled zinc.

Figs. 3-10 . . . Drawing operations performed by each Waterbury-Farrel Horizontal Press.

This complete, automatic production unit by Waterbury-Farrel produces small zinc containers for flashlight and hearing aid batteries for a large manufacturer. The unit consists of a 40-ton Double-acting Upright Blanking and Cupping Press, four 7-station Horizontal Drawing Presses and a conveyor which feeds the presses.

A FEW OF THE MANY TYPES OF METAL WORKING MACHINERY MADE BY WATERBURY-FARREL

POWER PRESSES—Crank · Cam and Toggle; also Rack and Pinion Presses · Transfer Presses · Multiple Plunger Presses · Hydraulic Presses, etc. **WIRE MILL EQUIPMENT**—Continuous Fine Wire Drawing Machines, including upright Cone and Tandem types Bull Blocks · String-up Machines · Spoolers, etc. · **COLD PROCESS BOLT AND NUT MACHINERY**—Headers (all types) · Reheaders · Trimmers · Thread Rolling Machines Slotters · Nut Tappers, etc. · **MILL MACHINERY**—Rolling Mills · Wire Flattening Mills, Chain Draw Benches · also Slitters · Straighteners · Pointers · Swagers · Cut-off Saws Coilers · Winders, etc.

Here's an example of the automatic mass production you can get with Waterbury-Farrel horizontal drawing presses.

These modern deep-drawing machines are available singly or in complete production line setups. The presses are available in a wide range of sizes for handling a large variety of work. The number of stations range from 5 to 12; maximum strokes from 3" to 26"; production speeds up to 100 per minute.

Features Include:

- High production — continuous deep drawing with no intermediate annealing.
- Patented shell transfer mechanism.
- Patented die-holder lubrication.
- Horizontally held shells cannot be deformed by trapped liquid.

For further details, write, wire or phone your nearest Waterbury-Farrel office.

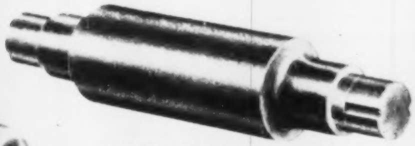
FOUNDED
WATERBURY FARREL
1851

In Equipment, Experience Counts . . .

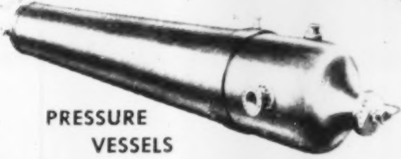
WATERBURY FARREL FOUNDRY & MACHINE COMPANY

WATERBURY, CONNECTICUT, U.S.A. • Sales Offices: Chicago, Cleveland and Millburn, N. J.

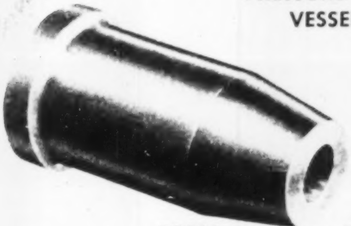
HEADQUARTERS FOR HEAVY STEEL FORGINGS



STEEL ROLLS



PRESSURE VESSELS



PRESS CYLINDER

RINGS

Whatever your needs for heavy steel forgings in industry, Midvale can assure you of the finest in craftsmanship, precision and ultimate performance. Whether it is weldless gear rings for turbine speed reduction . . . cylinders for hydraulic presses . . . weldless high-pressure vessels for oil refining, gas reactions and steam generation or hardened and ground steel rolls for cold rolling carbon and alloy steel, stainless steel, aluminum, copper, brass, zinc, foil, paper, linoleum, plastics and rubber . . . Midvale engineers can help you design them. Midvale craftsmen, with the most modern equipment, will build them to your most exacting specifications. Put your heavy forging problems in our hands.

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NICETOWN, PHILADELPHIA, PENNA.

OFFICES: NEW YORK • CHICAGO • PITTSBURGH
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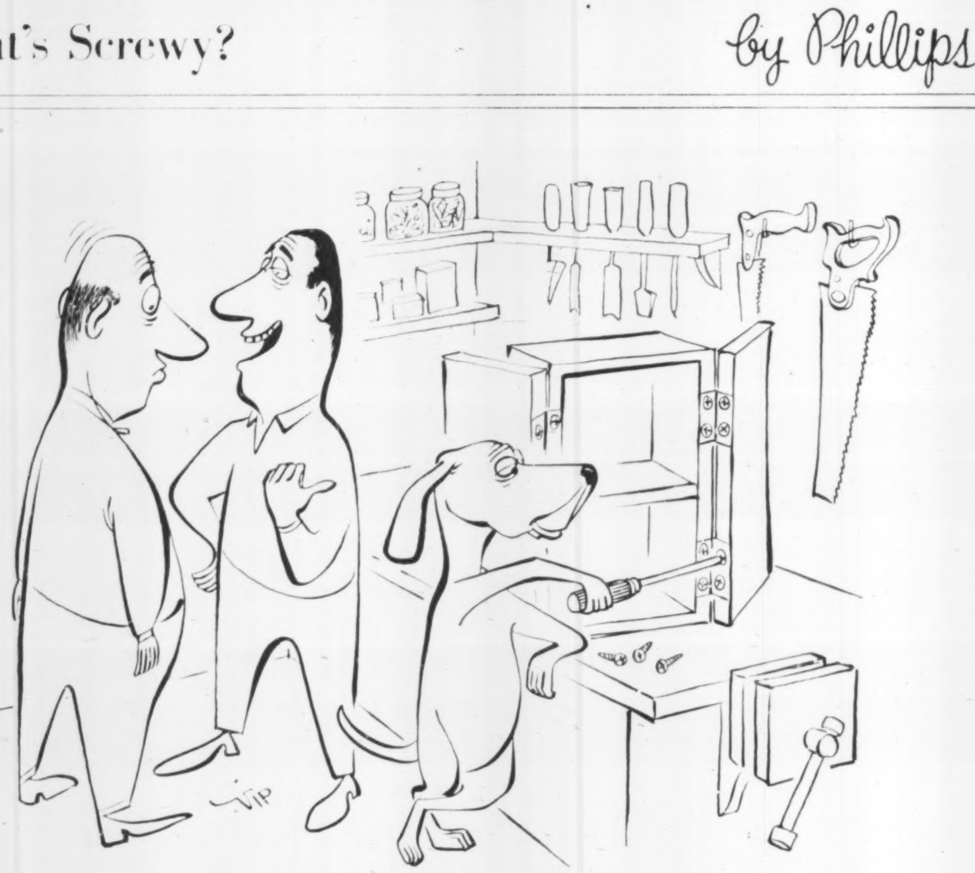
MIDVALE

Custom Steel Makers to Industry

PRODUCERS OF FORGINGS, ROLLS, RINGS, CORROSION AND HEAT RESISTING CASTINGS

What's Screwy? *by Phillips*



"Oh, he's not so smart. It's just that those Phillips Screws are so easy to drive."

EASE of driving is only *one* big advantage. Phillips Screws save time, work and money. They also add structural strength, set up tighter, resist the loosening effect of vibration. And they eliminate driver skids, damaged parts and split screw heads.

The identifying X on the cross-recessed-head identifies the x-tra quality of Phillips Screws instantly. Be sure to state "Phillips" on the specifications.

PERFECTLY MATED!

Only Phillips Drivers are perfectly mated to Phillips Screws. Look for the name Phillips on the shank.

PHILLIPS *Cross-Recessed-Head* SCREWS

✖ *marks the spot... the mark of extra quality*

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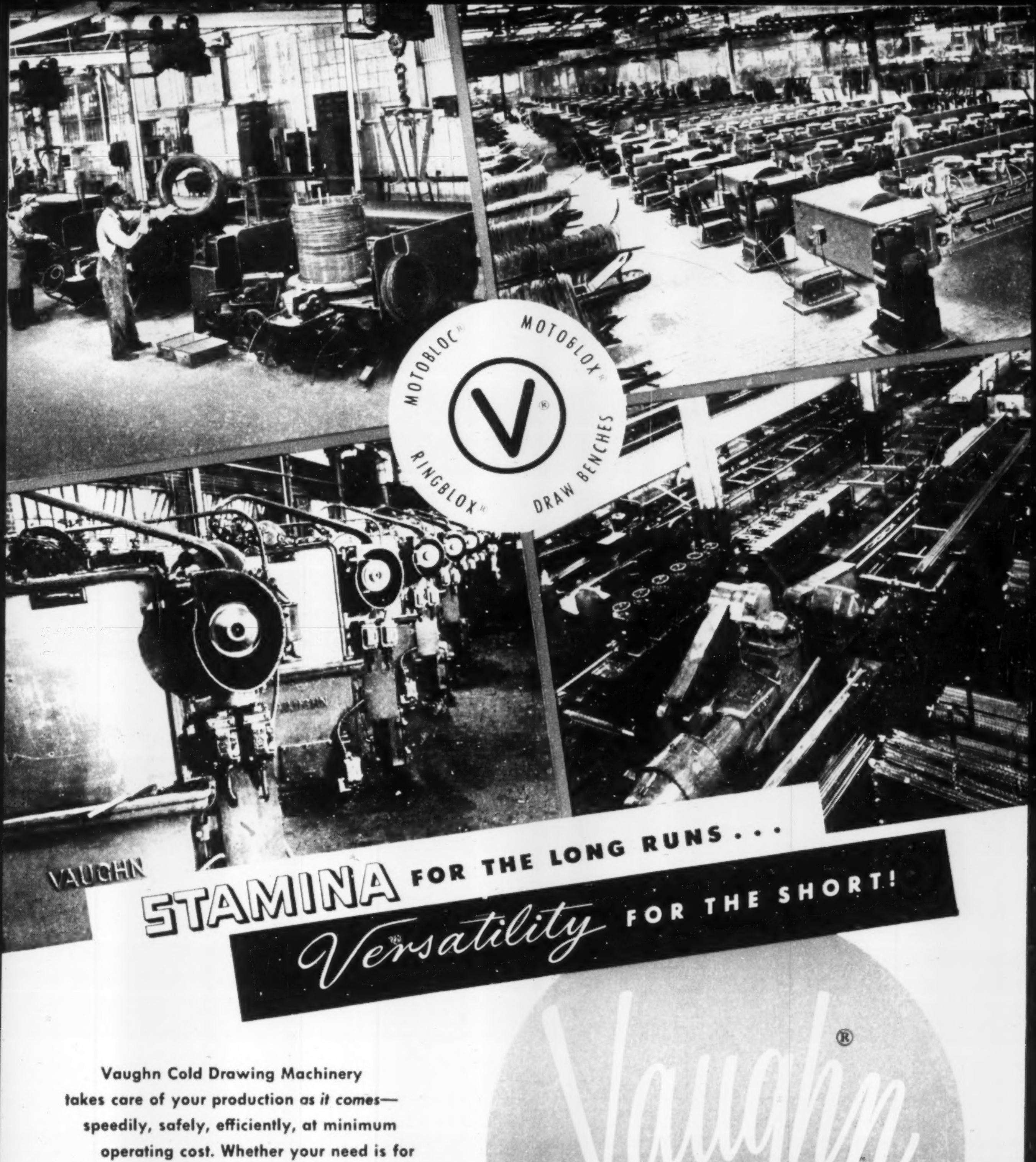
TODAY'S... AND THE FUTURE'S... FINEST FASTENER



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STAMINA FOR THE LONG RUNS . . .

Versatility FOR THE SHORT!

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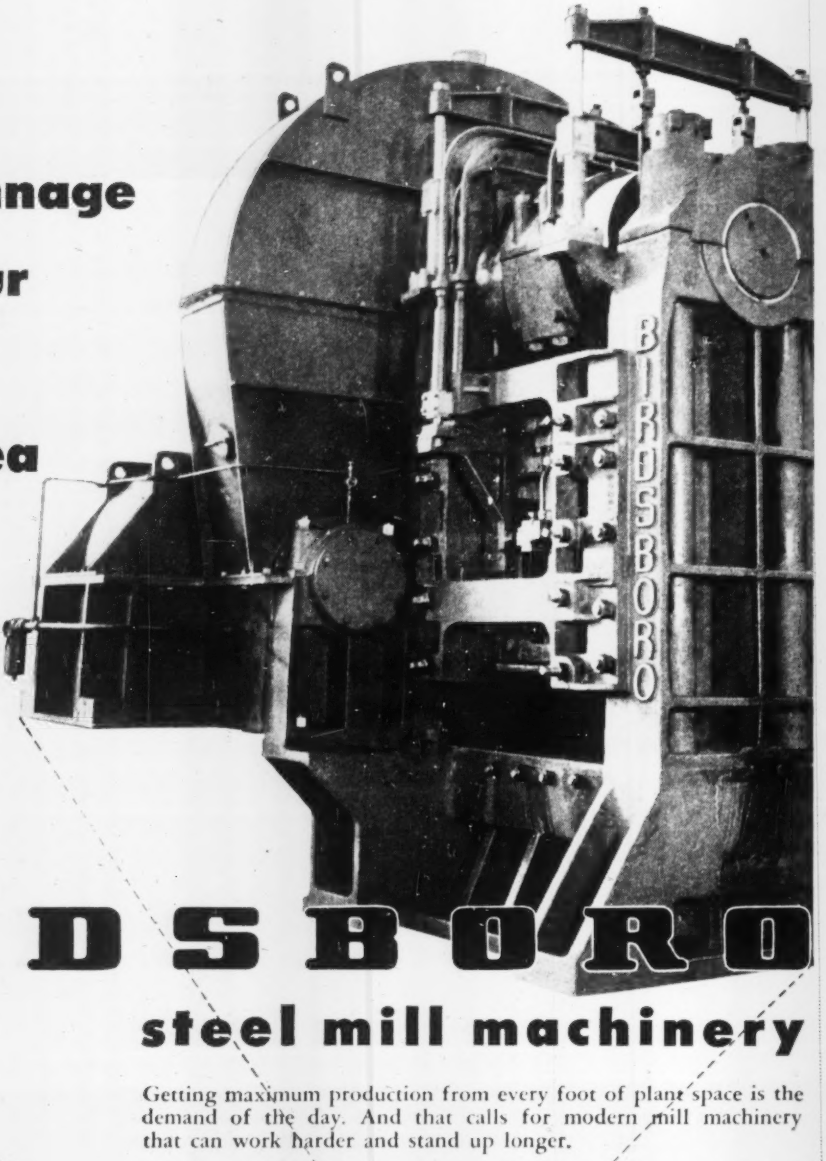
COLD DRAWING MACHINERY

Vaughn Cold Drawing Machinery
takes care of your production *as it comes*—
speedily, safely, efficiently, at minimum
operating cost. Whether your need is for
wire, bars, tubes or special shapes,
you'll find the *right* equipment
bears the Vaughn nameplate. *WRITE!*

THE VAUGHN MACHINERY CO.
CUYAHOGA FALLS, OHIO, U. S. A.
COMPLETE COLD DRAWING EQUIPMENT—Continuous or Single Hole
. . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous,
Non-Ferrous Materials or their Alloys.

For more tonnage from your present work area



This Birdsboro Bloom and Slab Shear has been designed and built to handle the maximum production of a new 32" Blooming Mill installation.

BIRDSBORO

steel mill machinery

Getting maximum production from every foot of plant space is the demand of the day. And that calls for modern mill machinery that can work harder and stand up longer.

Whether your job involves blooms, billets, rod, sheet, strip, plate, or other products, Birdsboro Mill Machinery is built to keep tonnage UP, maintenance time DOWN. A Birdsboro engineer will be glad to work with you on your individual requirements.

Layout of 32" Blooming Mill

Offices in:
Birdsboro, Pa.
and
Pittsburgh, Pa.

STEEL MILL MACHINERY

BIRDSBORO
STEEL FOUNDRY & MACHINE CO.
Birdsboro, Penna.

Designers and Builders of:
Steel Mill Machinery • Crushing Machinery • Rolls
Hydraulic Presses • Special Machinery • Steel Castings

MM24-52-R

Five basic types of gear-motors are also available with Fluid Drives.

Master Fluid-Drive units make use of a fluid coupling so designed that it can be interposed easily between the motor shaft and the output shaft (or motor shaft and first stage of gears of a gear-motor). Use Master Fluid-Drive Motors and gain these advantages.

SMOOTH ACCELERATION. With the fluid drive, the load is gradually accelerated . . . no sudden jerk at starting.

FULL POWER. Since there is no load on the motor when it starts, it very rapidly attains full running speed and the duration of the starting current inrush is greatly reduced.

CUSHION EFFECT. Provides cushioned starting . . . protects motors, gears, and driven equipment from damage from severe shock loads.

WIDE APPLICATION. Fluid-Drive Motors are ideal for high inertia applications where it takes a long time to bring the load up to speed . . . for starting crane travel drives without jerking and swinging the load . . . for conveyor drives especially where they are handling fragile material . . . for agitators, textile machinery, presses, extruders, winding machinery, food machinery, laundry machinery, ball mills, calenders, machines, etc.

cushioned power

SIZES. Master Fluid-Drive Motors are available in sizes approximately ½ to 15 horsepower.

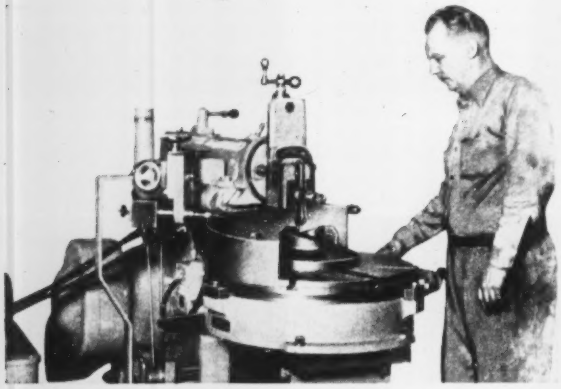
THE MASTER ELECTRIC COMPANY • DAYTON 1, OHIO

MASTER FLUID DRIVE MOTORS

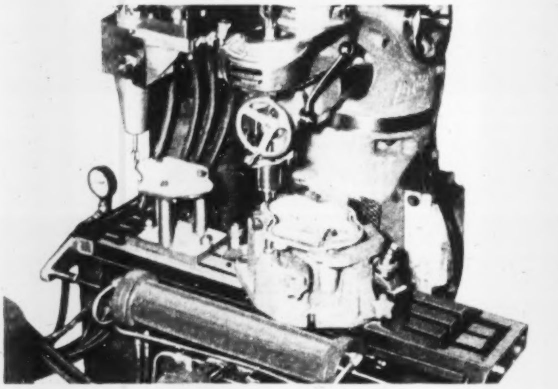
Why buy costly special equipment?

Convert your standard machines to produce difficult jobs with Turchan DUPLICATORS

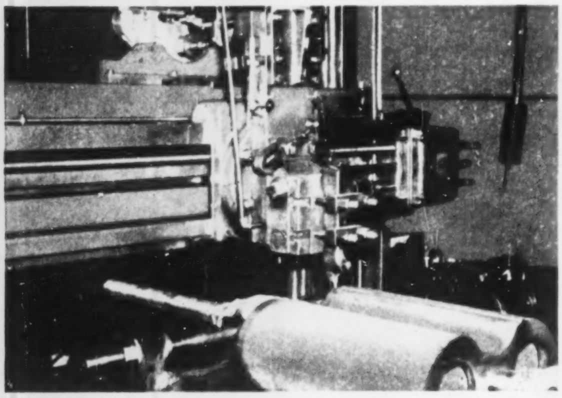
- The efficiency of almost any standard machine tool can be greatly increased with the Turchan.
- Users report savings in costs from 80% to 600%.
- Intricate profiles and contours easily accomplished.
- No special forming tools or skilled help required.
- Greatly expands variety of operations possible.
- Handling and set-up time are reduced over one half.
- Accuracies .001″ and finer surface finish.
- Completely eliminates chance for reject pieces.
- Instantly reconvertible to manual operation.



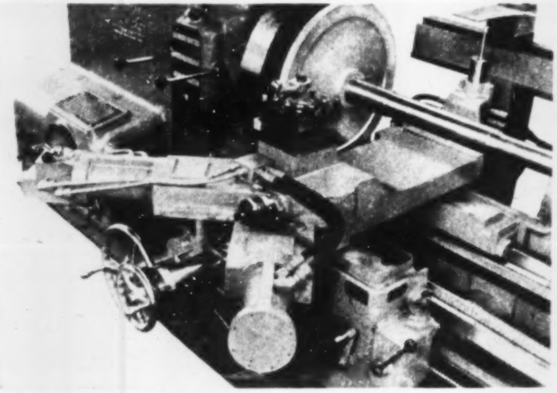
SHAPING: While producing this irregular contour, the tracer guides the varying height of table. Result: faster, automatic precision control.



MILLING: Contouring of unusual shaped washing machine part to close tolerance. Turchan method cut time to ⅕ of conventional way.



PLANING: Standard planer gains versatility with the Turchan attachment; machines contours of a blower section as easily as straight work.



TURNING: Turchan dual 45° attachment machines shaft and faces disc of this jet engine part in the same set-up. Simplifies all difficult jobs.

TELL US YOUR PROBLEMS: Send a blueprint or model of job with specifications for an estimate. Give make and model number of machine. Our engineering department is at your service, without obligation, to show you how to do better work, faster, at lower cost.

Write for New 20-Page Catalog

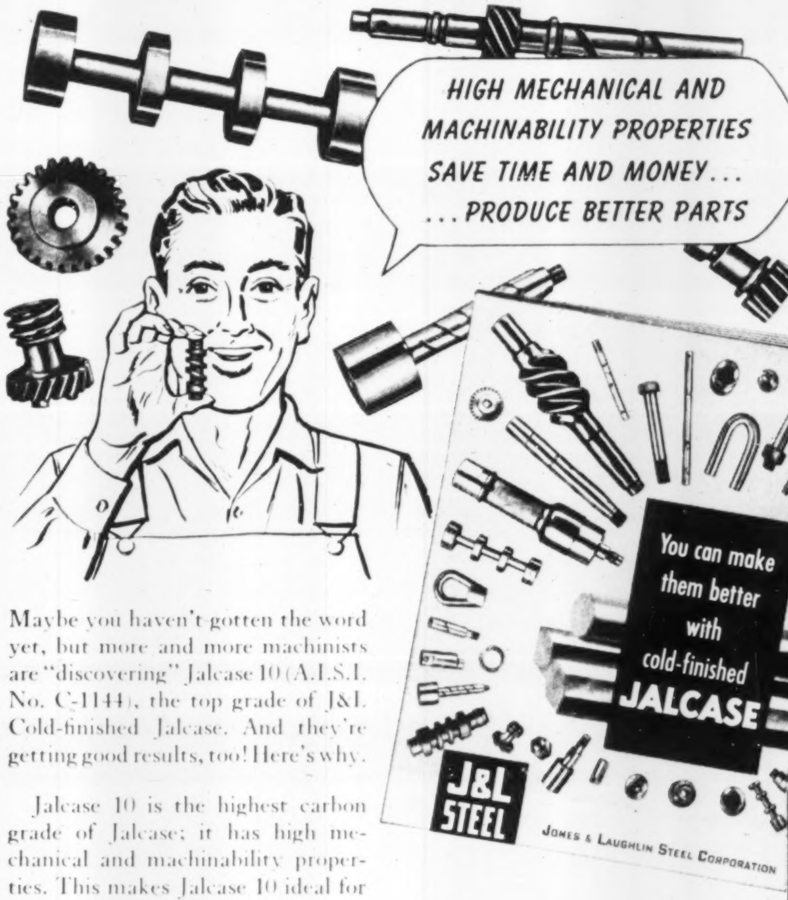
Turchan
HYDRAULIC
DUPLICATORS

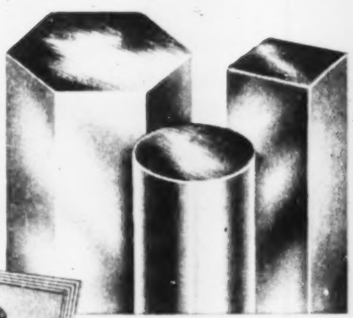
Turchan FOLLOWER MACHINE COMPANY
8259 LIVERNOIS AVENUE • • • DETROIT 4, MICHIGAN
OLDEST MANUFACTURER OF HYDRAULIC DUPLICATING ATTACHMENTS FOR MACHINE TOOLS

Tough Machining Problems Solved with J&L Cold-Finished

JALCASE 10

J&L STEEL


HIGH MECHANICAL AND MACHINABILITY PROPERTIES SAVE TIME AND MONEY... ...PRODUCE BETTER PARTS
You can make them better with cold-finished JALCASE
J&L STEEL
JONES & LAUGHLIN STEEL CORPORATION



Maybe you haven't gotten the word yet, but more and more machinists are "discovering" Jalcase 10 (A.I.S.I. No. C-1144), the top grade of J&L Cold-finished Jalcase. And they're getting good results, too! Here's why.

Jalcase 10 is the highest carbon grade of Jalcase; it has high mechanical and machinability properties. This makes Jalcase 10 ideal for those tough "in between" machining applications. For instance:

Many times the finished-parts specifications on a job call for a high degree of hardness, but not as high as that obtained through heat-treating the finished part. In these applications, manufacturers and machinists have found it profitable to use Jalcase 10 and dispense with the heat-treating altogether.

This saves production time and cuts down on costs. And Jalcase 10's high quality produces a better finish. It's worth your while to try Jalcase 10 on your screw machines.

GET THIS BOOKLET

FREE

You'll want more information about Jalcase 10 . . . and the other nine grades of Jalcase. Our booklet entitled "You Can Make Them Better with J & L Cold-finished Jalcase" contains information and technical data to help you produce better parts. This illustrated booklet is yours for the asking. Write today!

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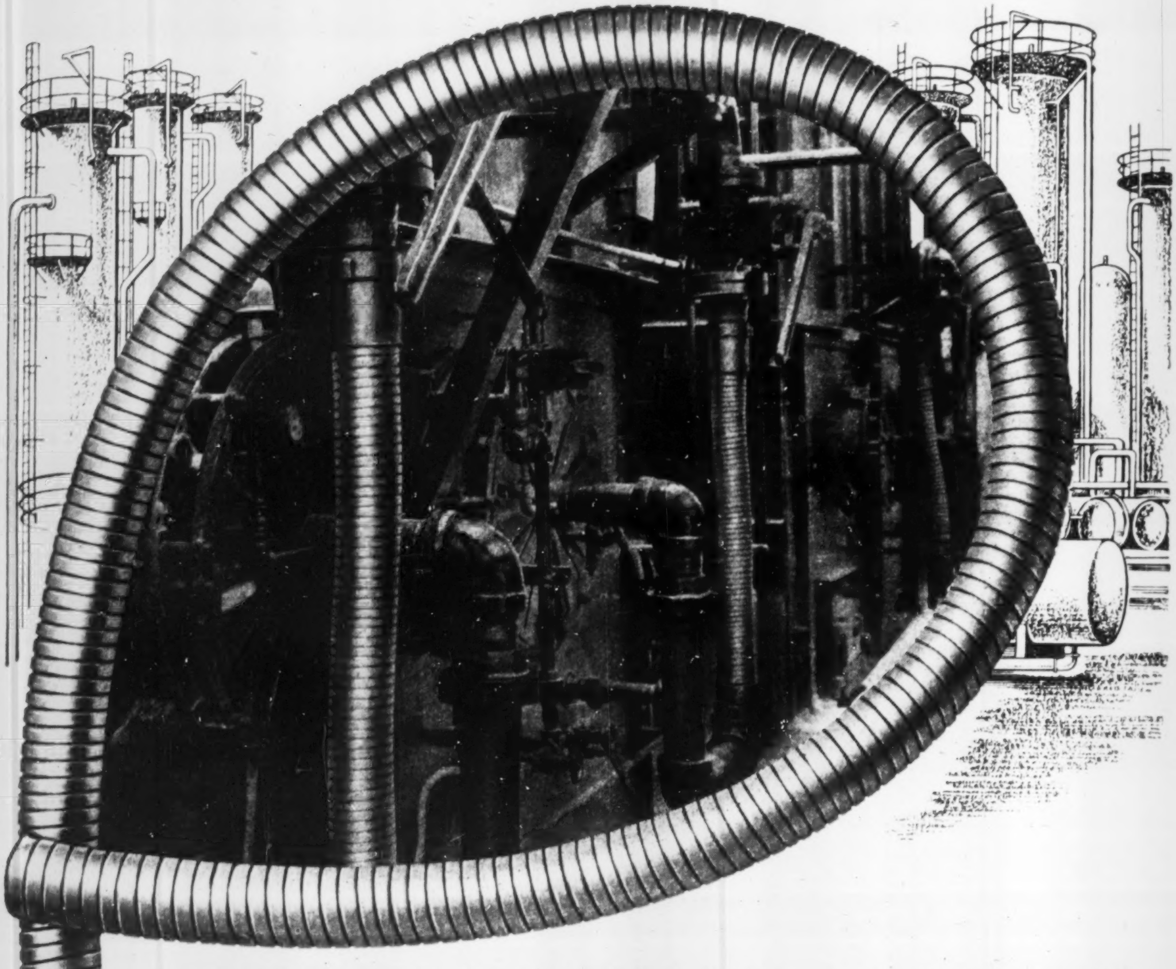
PRINCIPAL PRODUCTS: HOT ROLLED AND COLD FINISHED BARS AND SHAPES • STRUCTURAL SHAPES • HOT AND COLD ROLLED STRIP AND SHEETS • TUBULAR, WIRE AND TIN MILL PRODUCTS • "PRECISIONBILT" WIRE ROPE • COAL CHEMICALS



CORRUGATED "MUSCLES" THAT LET PIPES MOVE

PENFLEX METAL HOSE ABSORBS THERMAL EXPANSION . . . PREVENTS JOINT LEAKS

Petroleum still burners like this one in Kermit, Texas, put heavy strains on piping. Thermal expansion, contraction and physical shock make safe sealing of burner pipe joint assemblies a vital requirement.

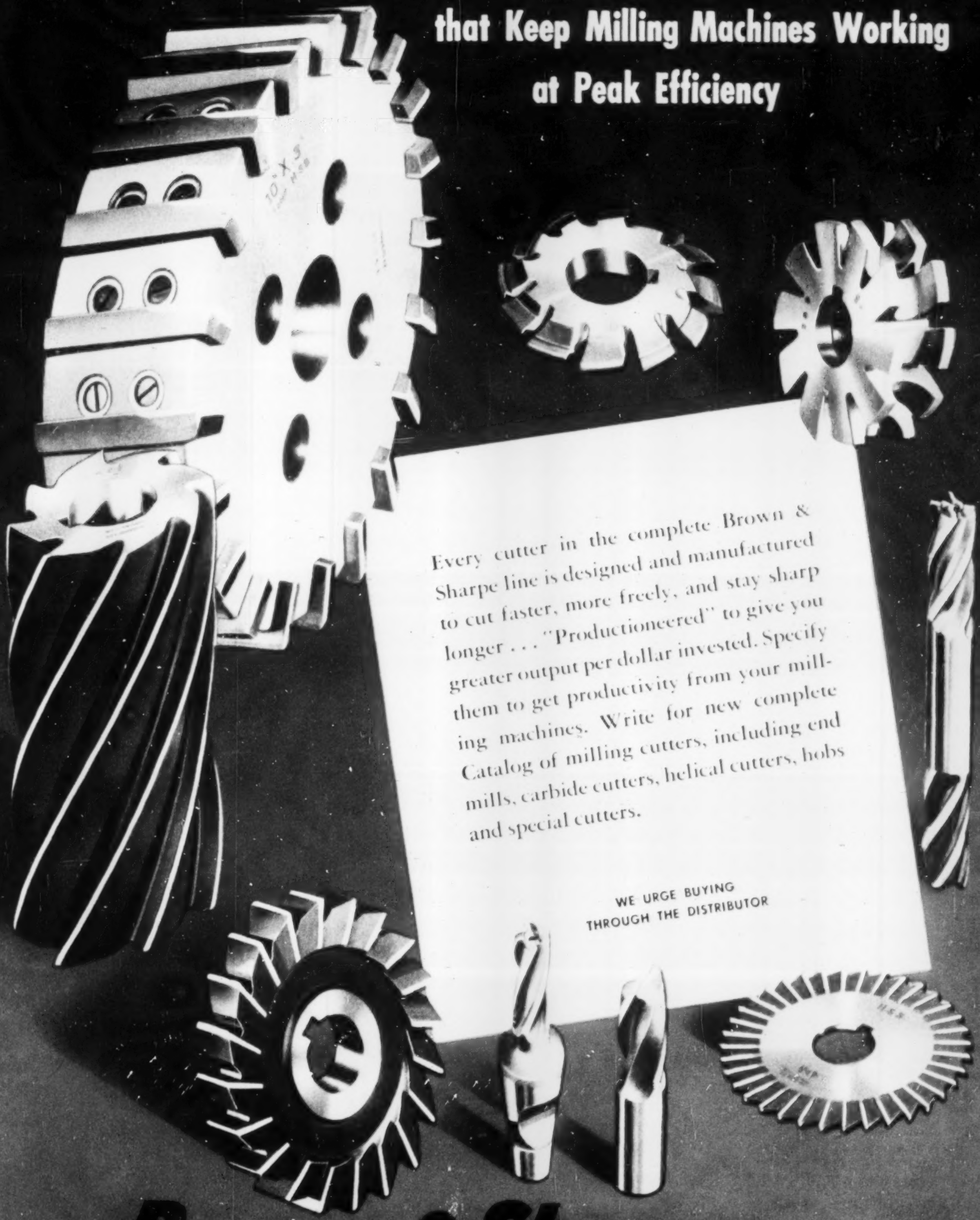
Penflex flexible metal hose with couplings is used on these burners to absorb any pipe movement due to extreme temperature and pressure changes. Lengths of 4" I.D. interlocking, four-wall galvanized steel hose are installed on each burner. Provides outstanding safety and high, uninterrupted flow of volatile fluids. Leakproof, tough and *flexible*.

Penflex engineers can help you solve flexible tubing application problems. Penflex manufactures a complete line of four-wall, interlocking and seamless welded corrugated tubing . . . from 1/8" I.D. and up . . . automatic barrel fillers, accessories and fittings. Write for illustrated folder, "Flexineering," containing valuable flexible tubing data for your product application.

Pennsylvania Flexible Metallic Tubing Company, Inc., 7219 Powers Lane, Phila. 42, Pa.
Branch Sales Offices: Boston • New York • Chicago • Houston • Cleveland • Los Angeles

Penflex

HEART OF INDUSTRY'S LIFE LINES



B·S

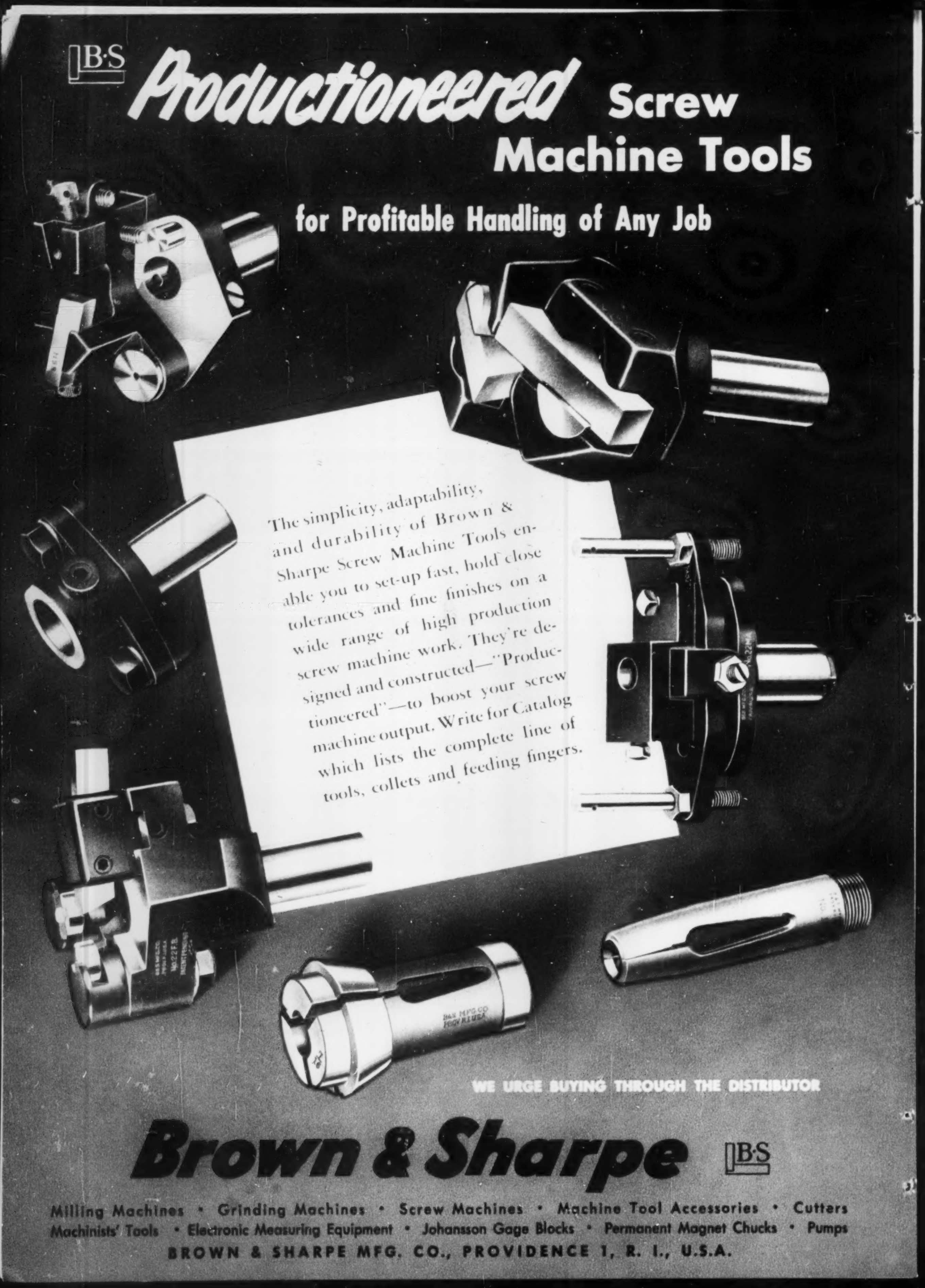
Productioneered Cutters

that Keep Milling Machines Working at Peak Efficiency

Every cutter in the complete Brown & Sharpe line is designed and manufactured to cut faster, more freely, and stay sharp longer . . . "Productioneered" to give you greater output per dollar invested. Specify them to get productivity from your milling machines. Write for new complete Catalog of milling cutters, including end mills, carbide cutters, helical cutters, hobs and special cutters.

WE URGE BUYING
THROUGH THE DISTRIBUTOR

Brown & Sharpe



Productioneered Screw Machine Tools

for Profitable Handling of Any Job

The simplicity, adaptability, and durability of Brown & Sharpe Screw Machine Tools enable you to set-up fast, hold close tolerances and fine finishes on a wide range of high production screw machine work. They're designed and constructed—"Productioneered"—to boost your screw machine output. Write for Catalog which lists the complete line of tools, collets and feeding fingers.

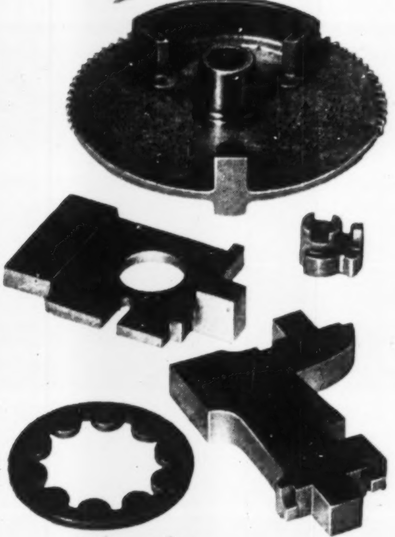
WE URGE BUYING THROUGH THE DISTRIBUTOR

Brown & Sharpe BS

Milling Machines • Grinding Machines • Screw Machines • Machine Tool Accessories • Cutters
Machinists' Tools • Electronic Measuring Equipment • Johansson Gage Blocks • Permanent Magnet Chucks • Pumps

BROWN & SHARPE MFG. CO., PROVIDENCE 1, R. I., U.S.A.

MANPOWER SHORTAGE
MATERIAL SHORTAGE
MFG. SPACE SHORTAGE
MACHINERY SHORTAGE
TIME SHORTAGE
When Shortages Bedevil You Think of
OILITE



OILITE Finished Machine PARTS Assure YOU

- ★ No Tooling on Your Part.
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- ★ Accurate Parts (Machine Tool Tolerances).
- ★ Low Cost (Less than Machined Parts).
- ★ An Engineered Product.
- ★ Greater Freedom in Design.
- ★ Broad Range as to Size and Materials.
- ★ Consultation with Field Engineers.
- ★ The Benefit of More than Twenty (20) Years of Powder Metallurgy "KNOW-HOW."

We are told—"OILITE is the Favorite"

AMPLEX MANUFACTURING COMPANY
Subsidiary of Chrysler Corporation
Detroit 31, Michigan

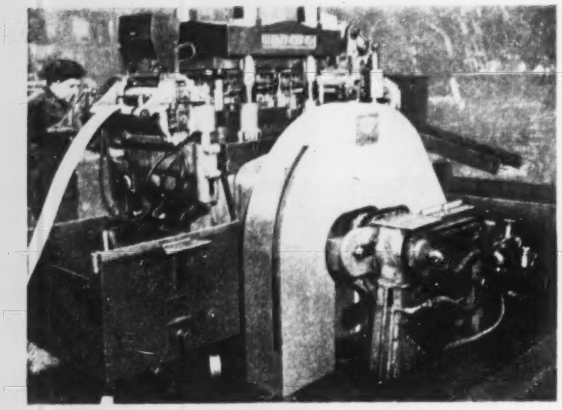
FIELD ENGINEERS AND DEPOTS THROUGHOUT UNITED STATES AND CANADA

Oilite Products Include: Bearings, Finished Machine Parts, Cored and Solid Bars, Permanent Filters and Special Units.

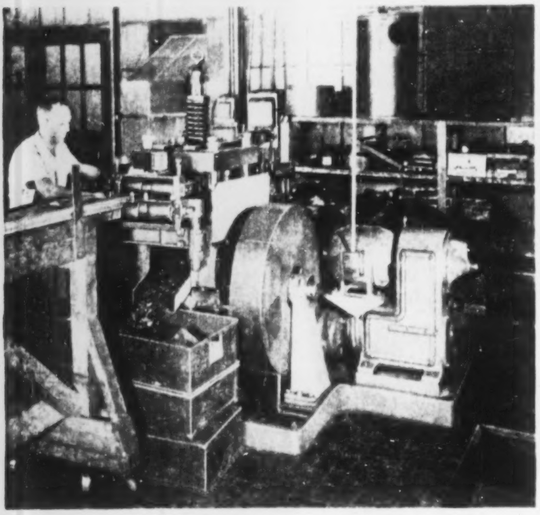
OILITE
TRAPPED OIL
BEARINGS

Copyright 1952—The Chrysler Corp.

Modernize Metal Stamping with Henry & Wright Dieing Machines



In Chrysler's Highland Park plant (above), Henry & Wright Dieing Machines are used to make fluid coupling fins and torque converter impeller blades. At Knapp Monarch (below), Dieing Machines produce rotor and stator laminations complete per stroke.



IT PAYS 3 BIG WAYS

1. *Combine operations - - use progressive stamping more efficiently, for more parts*
2. *High quality work at high speed*
3. *High speed plus long die life*

In Plant After Plant Henry & Wright Dieing Machines are setting new record highs in the number of pieces produced per hour, in work quality and die life. A high production tool, this unique press is proving that it can do as much work as five to ten conventional presses. It provides both high speed and long die life—a combination unavailable in any other press.

Only the best is good enough

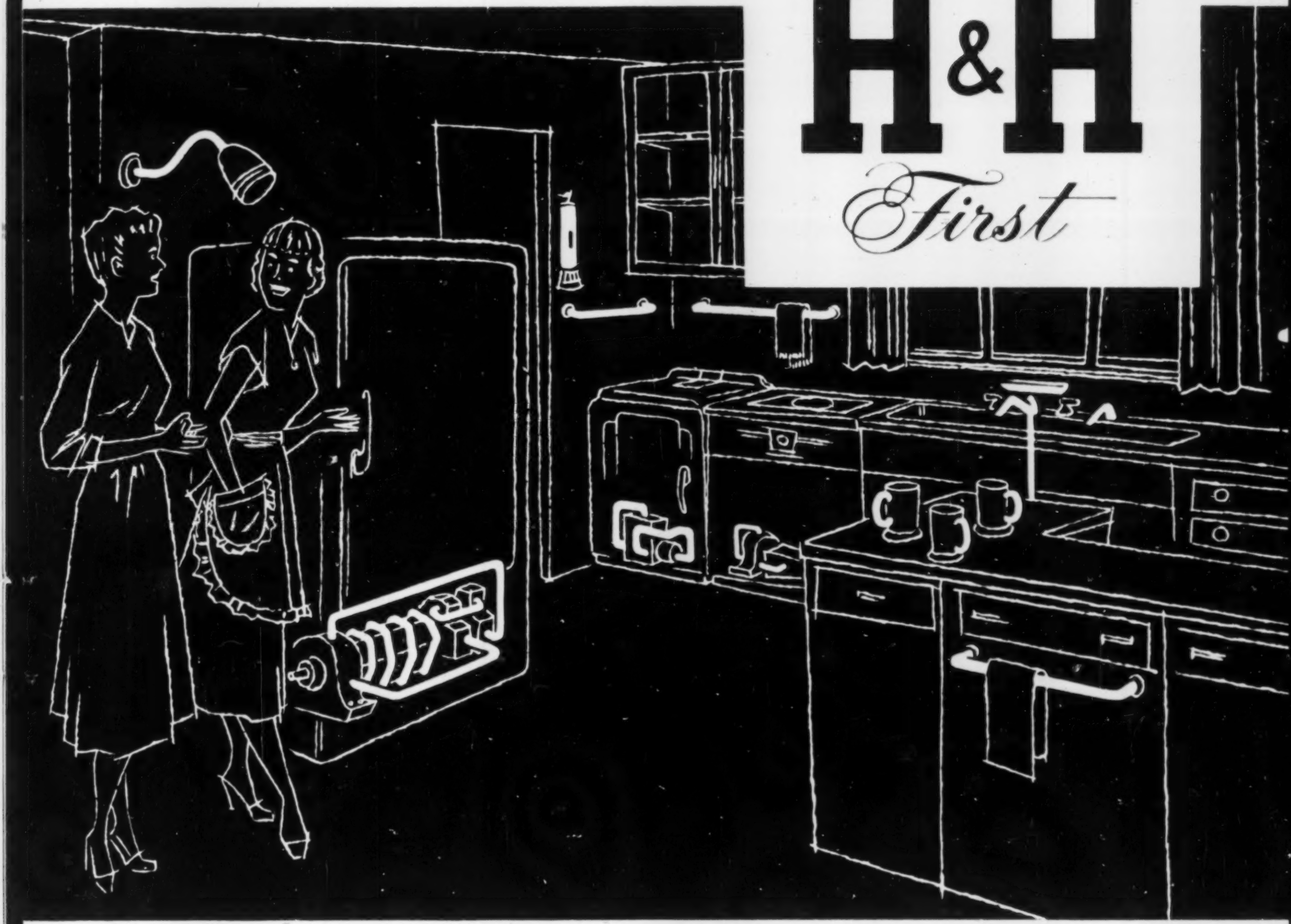
Capacities of Henry & Wright Dieing Machines range from 25 tons to 2500 tons pressure. Our catalog available upon request describes machines up to 400 tons. Larger capacities are custom built to requirements. Write Henry & Wright, 461 Windsor St., Hartford 5, Conn.

H&W

HENRY & WRIGHT
Division of Emhart Mfg. Co.

For Brass and Copper Tubing that will LAST...

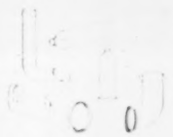
Think of H&H *First*



KITCHEN appliances and fixtures, like those shown above, are designed and built to render years of efficient, trouble-free service while sustaining unrelenting daily use. That is why manufacturers in this, as well as in practically every other field of industry, specify H & H brass and copper tubing and fabricated parts for those applications where quality and long life count. No matter what *you* manufacture, no matter how exacting *your* requirements, for brass and copper tubing that will *last*, see your nearby H & H representative *first*.

H&H TUBE AND MANUFACTURING COMPANY
255 North Forman Avenue, Detroit 17

Originators and sole makers of "Metalflo"— the economy tubing



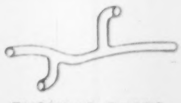
FABRICATED PARTS

Brass and copper seamless tubing fabricated in O.D.'s from ⅛" to 1½", inclusive, in wall thicknesses of .010 up to and including .065". Special facilities for small diameter parts with O.D.'s of ¾" and smaller.

METALFLO

LOCKSEAM

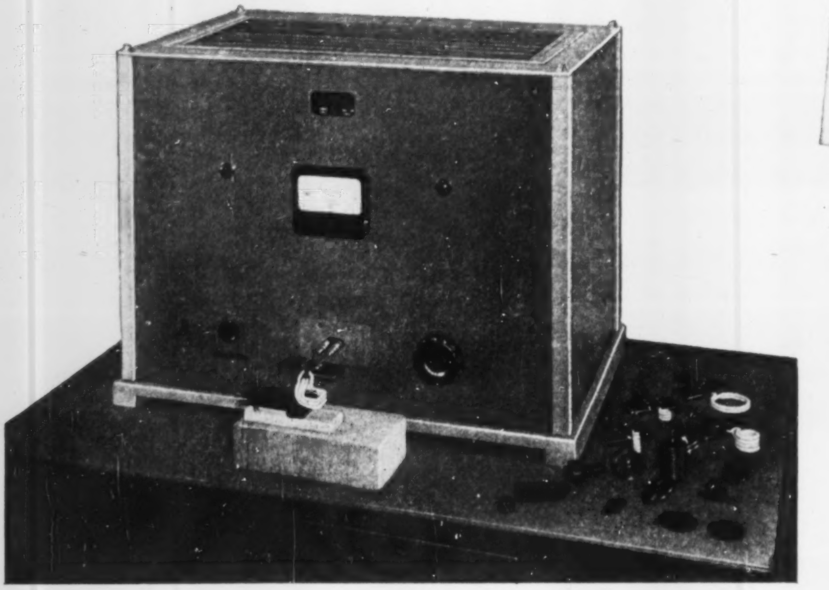
COIL STRIP AND SEAMLESS TUBING



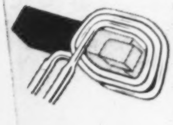
TUBULAR PARTS

Lepel *presents*

A *Low Cost* PORTABLE HIGH FREQUENCY *Induction* HEATING UNIT

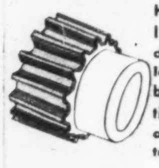


BRAZING



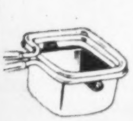
Permits widest choice of silver or copper brazing alloys from lowest to highest melting points. Ideal for brazing carbide tips.

HARDENING



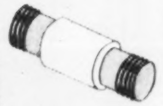
Heat localized exactly where wanted at desired temperature. Ideal for gears, cams, bearing surfaces, cutting tools and other areas that are subject to wear.

SOLDERING



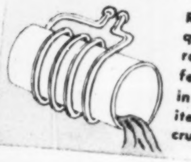
Speedily and neatly performs intricate soldering applications with or without the use of pre-formed rings.

ANNEALING



Ideal for annealing, stress-relieving, normalizing or preheating selected areas.

MELTING



Readily melts quantities of ferrous and non-ferrous metals in either graphite or ceramic crucibles.

- **SMALL AND COMPACT**
  Conveniently operated on bench or table—no mounting necessary.
- **ECONOMICAL OPERATION**
  No special power installation required. Operates on 110 volts, 60 or 50 cycle line at unity power factor.
- **FULLY GUARANTEED**
  Guaranteed for continuous duty cycle and stated performance.

This versatile unit is priced so low that every shop may now take advantage of modern induction heating techniques to improve quality and to increase production. Its simplicity of operation eliminates the need for skilled personnel.

The Lepel Model 2 KW will meet the requirements of machine shops, toolrooms, research laboratories and educational institutions. It is especially suitable for hardening, brazing and soldering small parts of either ferrous or non-ferrous metals.

Complete unit with line connection and load coil.

$870.

f.o.b. factory

WILL HEAT TO 1500° F.

1/8"	steel rod 1" length in approx.	1 second
1/4"	" " " " " "	3 seconds
1/2"	" " " " " "	15 seconds
1"	" " " " " "	60 seconds

Will melt 4 ounces of brass or steel in 4 minutes.
Equally well suited for heating of non-ferrous metals.

LEPEL HIGH FREQUENCY LABORATORIES, INC.
55th STREET and 37th AVENUE, WOODSIDE 77, NEW YORK CITY, N. Y.

ALL LEPEL EQUIPMENT IS CERTIFIED TO COMPLY WITH THE REQUIREMENTS OF THE FEDERAL COMMUNICATIONS COMMISSION.
WRITE FOR LEPEL CATALOG ST-1

the switch is to STAINLESS-CLAD PLATES

for lower costs... extension of material supplies

More and more, economy-minded buyers are switching to Stainless-Clad Steel Plates as an effective means of extending supplies of critical materials and of beating the high cost of stainless steel.

They find that in numerous types of fabrication these plates give them all the advantages of stainless steel, including high resistance to corrosion—yet with considerable savings in material costs.

Stainless-Clad Plates made by Claymont are a composite of stainless steel permanently bonded to carbon or alloy steel plate. They're easy to fabricate; will not buckle, crack or peel under the severest forming operations. Stainless cladding may be of any specified percentage of total plate from 10% to 50%.

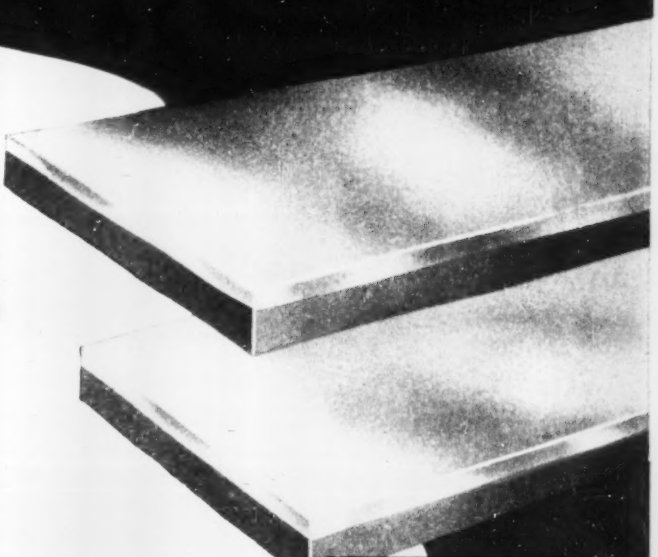
Other Claymont products include Flanged and Dished Heads, Alloy and Carbon Steel Plates, Large Diameter Welded Steel Pipe.

To order, write or call Claymont Steel Products Department, Wickwire Spencer Steel Division, Claymont, Delaware.

THE COLORADO FUEL AND IRON CORPORATION • Denver, Colorado
THE CALIFORNIA WIRE CLOTH CORPORATION • Oakland, California
WICKWIRE SPENCER STEEL DIVISION • Atlanta • Boston • Buffalo • Chicago
Detroit • New York • Philadelphia

CLAYMONT STEEL PRODUCTS

PRODUCTS OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

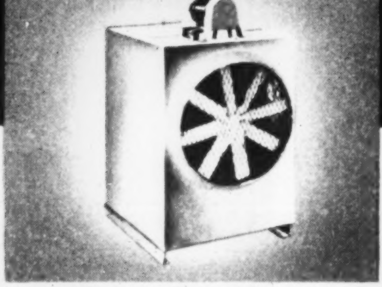


Flanged and Dished Heads

Carbon and Alloy Steel Plates

Large diameter steel pipe

Fastenings of rustproof prevent this:



Cheap enough to install — but fastenings that rust are costly in the long run for the customer and the manufacturer.

Only 73¢ more total cost. But by using fastenings of EVERDUR, rather than ordinary bolts, Halstead & Mitchell make it possible to disassemble cooling towers, *even after years of exposure to all weather extremes.*

For the customer, equipment fastenings that rust in service mean *extra* labor costs in dismantling. To the manufacturer, a dangerous loss of prestige. Design engineers can easily avoid these troubles by specifying bolts, screws and accessories made of EVERDUR — *strong, tough, rustproof* and *corrosion-resistant.*

EVERDUR Copper-Silicon Alloys also have many other structural and engineering uses — in sewage and water works installations, chemical processing plants, marine and pole line hardware, air-conditioning equipment, etc. They are easily fabricated and welded. They are available in all the usual forms: sheet, wire, rod, bar, tube, angle, channel, T- and I-beams and casting ingots. EVERDUR can help you build longer service life into equipment subject to unusual stress, severe weather, under-water or other corrosive conditions. For further information on EVERDUR Alloys for Bolts, Screws and Accessories, write for Publication E-6. The American Brass Company, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

*Registered U. S. Pat. Off. 5216

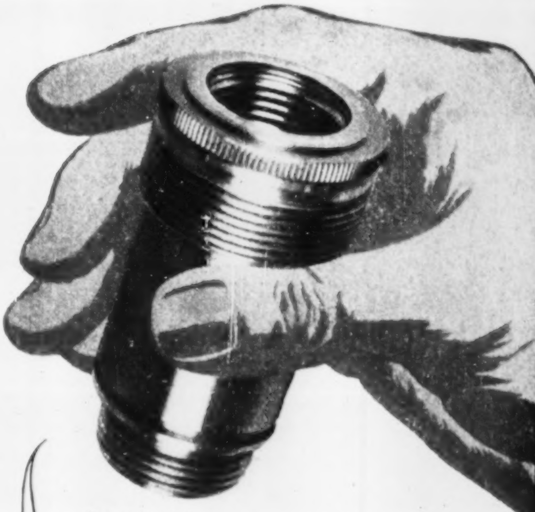
EVERDUR

®

COPPER-SILICON ALLOYS

STRONG • WELDABLE • WORKABLE • CORROSION-RESISTANT

if you had a few million to make...



you'd analyze this Army Ordnance job in terms of *end results*—machines are only a *means* to profitable ends.

You would make certain that one basic production unit gave you maximum number of operations—because extra equipment for doing any one or more of the 16 operations in a separate set-up would increase machine investment, floor space and man-hour costs.

You would want to know "how fast?" so to establish dependable production schedules—not theoretical output, but a guaranteed average of gauge passing pieces at each work turn. Our approach to this is through a vast experience in tooling—ingeniously engineered in a way to get the most out of each job.

These are precisely the end results which led many firms now producing this Ordnance job in million lots to specify—

Acme-Gridley Multiple Spindle Automatics

Your particular work is different, but only in form and size. Ask your engineers to talk with ours about *end results*. This practice has resulted in our sales of more than 45,000 machines.

JOB FACTS:

Part—Steel Container

Size—3" long x 1½" diam.

Material—FS1117

Operations—16 including shaving all over, 2 rolled threads, knurl and tap, all class 2 threads and .002 limits on front flange

Machine time—36 seconds, 100 per hour.

Machine—Acme-Gridley 6 spindle 1⅝" Bar Automatic

The NATIONAL ACME COMPANY

170 EAST 131st STREET • CLEVELAND 8, OHIO

Acme-Gridley Bar and Chucking Automatics, 1-4-6 and 8 Spindle—Hydraulic Thread Rolling Machines—Automatic Threading Dies and Taps—Limit, Motor Starter and Control Station Switches—Solenoids—Contract Manufacturing.

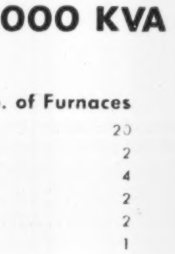
THE WORLD MELTS WITH *Lectromelt**...

35 Countries...1,056 Lectromelt Furnaces...2,480,000 KVA

LECTROMELT FURNACES THE WORLD OVER

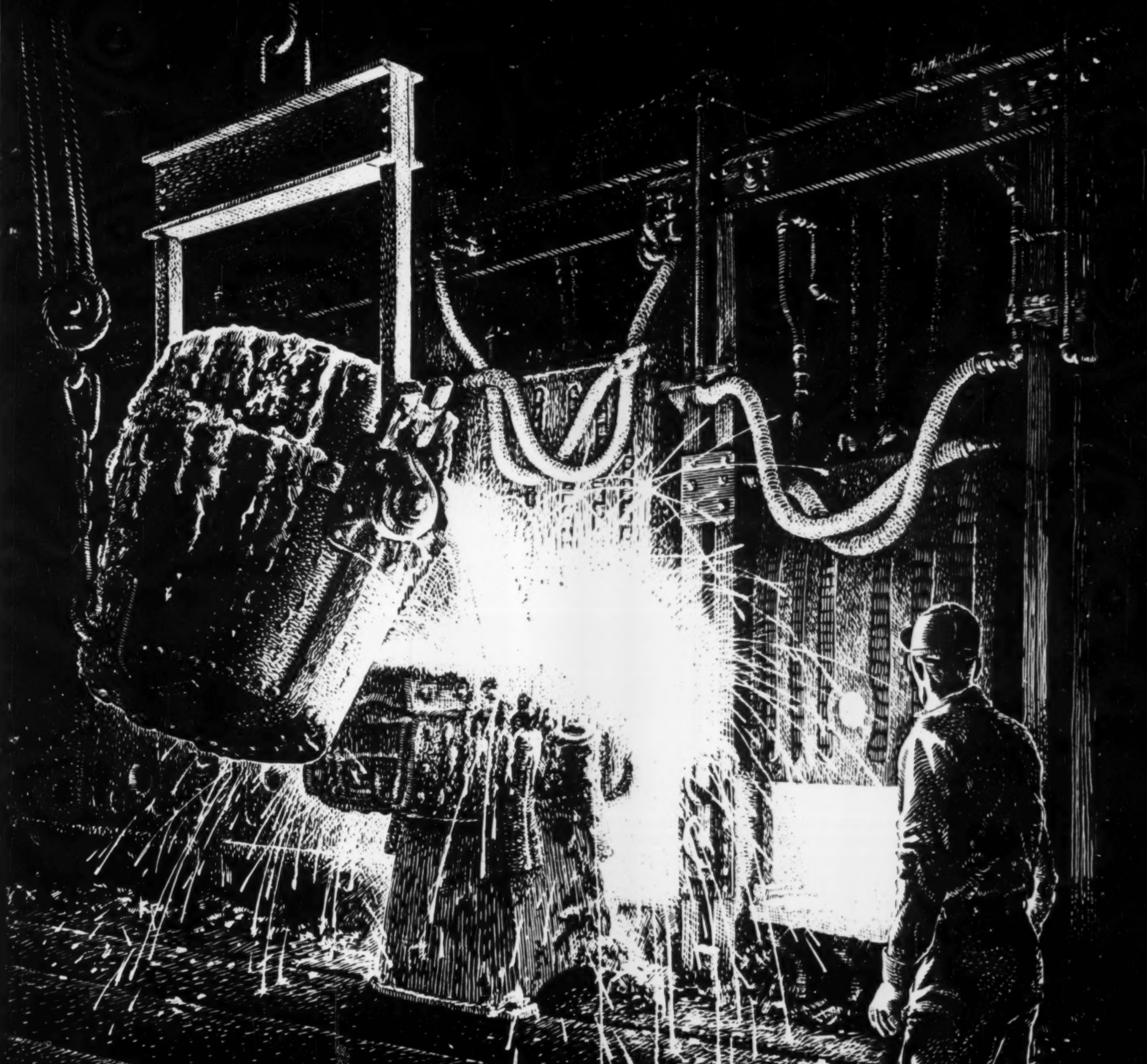
Country	No. of Furnaces	Country	No. of Furnaces
AFRICA	28	MEXICO	20
ARGENTINA	2	NEW CALEDONIA	2
AUSTRALIA	12	NEW ZEALAND	4
BELGIUM	2	NORWAY	2
BOLIVIA	2	PANAMA CANAL	2
BRAZIL	30	REP. OF PANAMA	1
CANADA	50	PERU	4
CHILE	11	PHILIPPINE ISLANDS	3
CHINA	17	POLAND	3
COLOMBIA	7	PORTUGAL	4
DENMARK	2	RUSSIA	69
ENGLAND (BR. ISLES)	70	SPAIN	26
FINLAND	4	SWEDEN	8
FRANCE	4	TURKEY	2
HAWAII	1	UNITED STATES	635
ITALY	16	URUGUAY	1
INDIA	9	VENEZUELA	1
JAPAN	2		

Manufactured in . . . **CANADA**: Lectromelt Furnaces of Canada, Ltd., Toronto 2 . . . **ENGLAND**: Birlec, Ltd., Birmingham . . . **FRANCE**: Stein et Roubaix, Paris . . . **BELGIUM**: S. A. Belge Stein et Roubaix, Bressoux-Liege . . . **SPAIN**: General Electrica Espanola, Bilbao . . . **ITALY**: Forni Stein, Genoa.


TWENTY FIVE POUNDS TO
ONE HUNDRED FIFTY TONS CAPACITY

MOORE RAPID

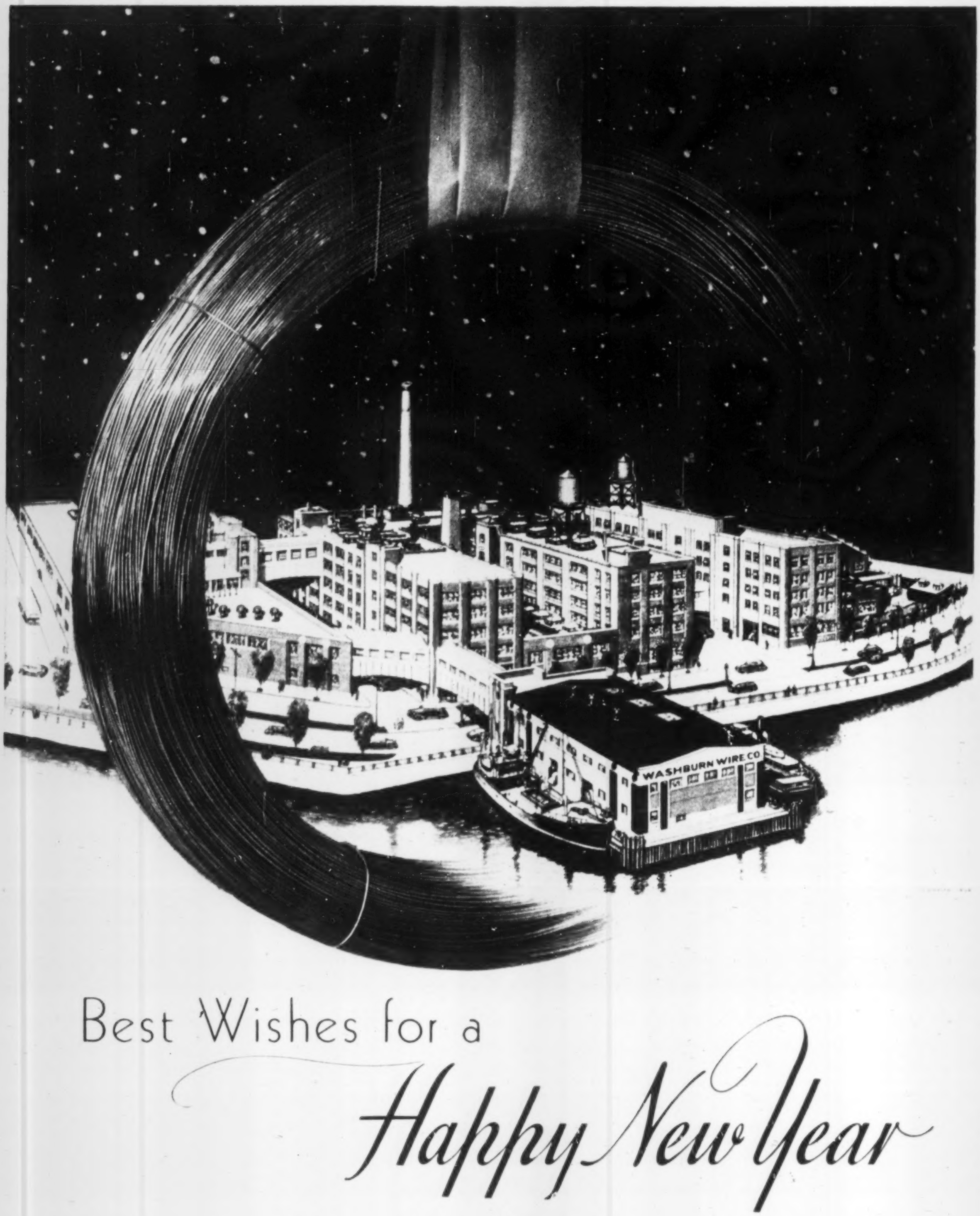
WHEN YOU MELT... *Lectromelt*



LACLEDE

Producers of Quality Steel
for Construction and Industry

LACLEDE STEEL COMPANY
SAINT LOUIS, MISSOURI



Best Wishes for a

Happy New Year

WASHBURN WIRE COMPANY, NEW YORK CITY

WASHBURN

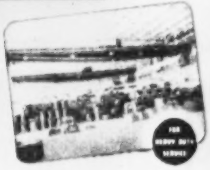
CLEAN, UNIFORM BILLETS - STRIP - RECTANGULAR, ROUND, FLAT RODS
TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

For Tons of EXPERIENCE

When you install a Northern Overhead Electric Traveling Crane or heavy duty Hi-Lift Hoist you are utilizing the full benefit of our 53 years experience as crane builders for many of the most efficiently operated and competitive companies in American industry.

One of these companies has installed over 700 Northern Cranes in its many plants for a wide range of material handling usage — adding up to an amazing tonnage in capacity, and in experience!

It takes the best experience available to tool properly to remain competitive today. Northern Cranes can safely assure you a satisfactory, dependable, long-term tooling investment based on tested, seasoned experience.



NORTHERN ENGINEERING WORKS

Write for new Super-Crane Bulletin No. SE-108-161 for information and major specification details of Northern Super-Cranes and Super-Trolleys.

NORTHERN ENGINEERING WORKS

General Offices: 2615 Atwater St., Detroit 7, Michigan

BUILDERS OF CRANES AND HOISTS EXCLUSIVELY

If your answer to either of these questions is YES

...call for a Simmons Rebuilding Engineer

1. Have you any heavy machine tools that are not operating at full potential (possibly due to obsolescence, missing parts or need for redesign)?

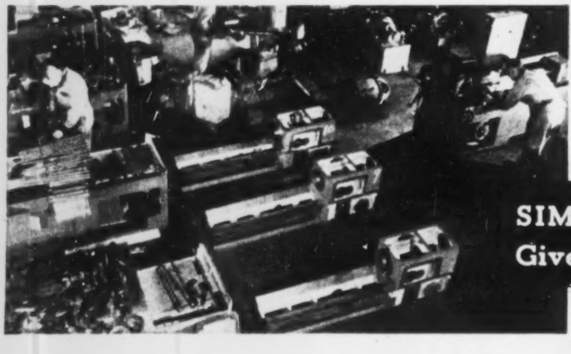
2. Do you need any big "special" machine tools . . . the type that take original equipment suppliers two years to build?

Examine your plant equipment again with these questions in mind. If your answer to either is "Yes", Simmons may be able to help you in two ways:

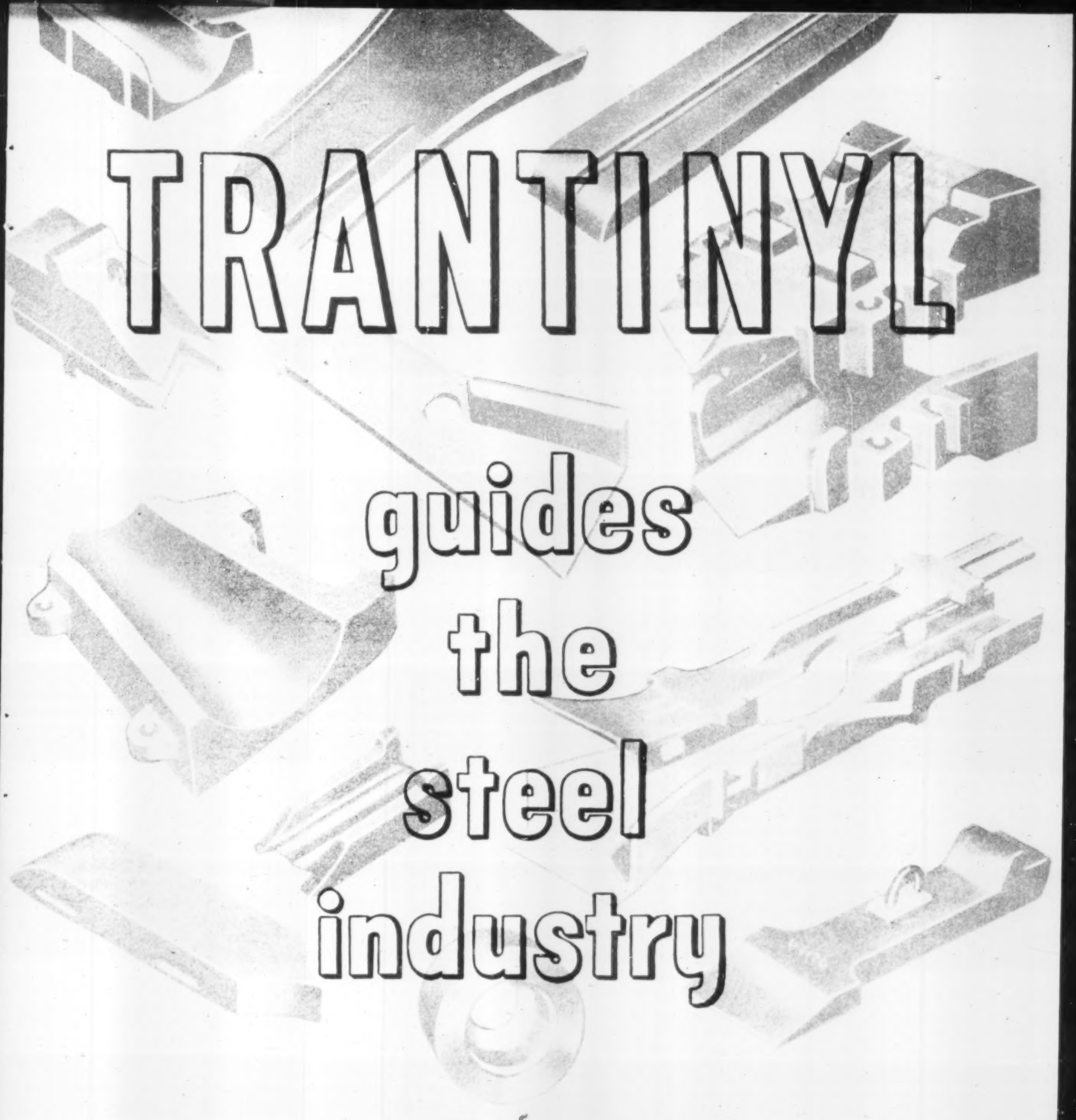
- **First,** by rebuilding used machine tools, now in your plant, for as low as 50% of the cost of new ones...and delivering them, with new-machine accuracy guaranteed, up to 300 days sooner.
- **Second,** by transforming heavy machine tools, no matter how old, into modern special-purpose units ready for 24-hour application on defense production.

You can send used machine tools to Simmons for rebuilding with complete confidence. Those who have done so during the past forty years make up a blue book of American industry. Simmons' unique rebuilding process is described in a 60-page book "The Simmons Way", a copy of which is yours for the asking. For quick action on immediate needs, call for a Simmons rebuilding engineer.

SIMMONS MACHINE TOOL CORPORATION
1755 North Broadway, Albany 1, N. Y.



SIMMONS ENGINEERED REBUILDING
Gives Machine Tools a New Lease on Life



TRANTINYL
Guides
THE STEEL INDUSTRY

TRANTINYL

guides the steel industry

YOUNGSTOWN ALLOY CASTING CORP., • YOUNGSTOWN, O.

ROLLING MILLS: bar, hoop, strip, shape mill guides, and rollers. SEAMLESS TUBE MILLS: guide shoes, rolling mill plugs and rolls, piercer points, etc.
ELECTRIC WELD TUBE MILL: forming rolls, planishing rolls, tool holders, etc. • STRAIGHTENING MACHINE GUIDES • HEAT RESISTING CASTINGS

Here comes Aluminum

The amount of electricity it takes to produce one ton of aluminum is enough to light your house for 15 years! Thus aluminum production takes a lot of water power.

The torrent above is a view of the mighty Saguenay River, which turns the turbines of the 1,500,000-horsepower Shipshaw hydroelectric plant that supplies power for the Aluminum Company of Canada—one of the world's great aluminum producers.

Alcan, as most of us in the business call it, is one of the Aluminium Limited companies, whose products we distribute.

Utilizing great power resources and modern production facilities, we are supplying millions of pounds of aluminum which are being employed to strengthen transportation, essential industry, and military security. At the same time, we are striving to relieve the shortage of aluminum for the thousands of other uses where its qualities are desirable—and desired.

ALUMINUM IMPORT
CORPORATION

Distributing company of the **ALUMINIUM LIMITED** *group, in the Western Hemisphere*
Offices and agents in 40 cities *Cable address:* ***ALIMPORT***
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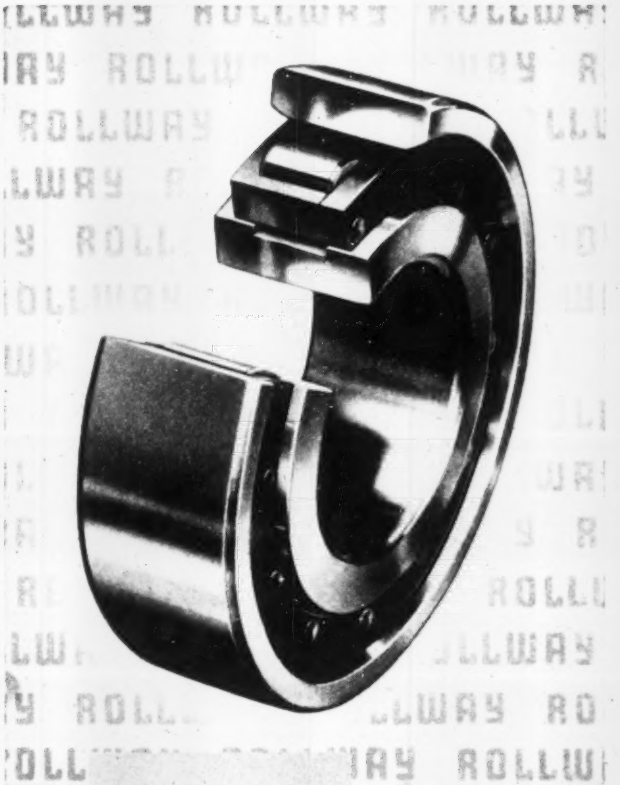


In-Built Trueness...

basis for longer life and lower cost!

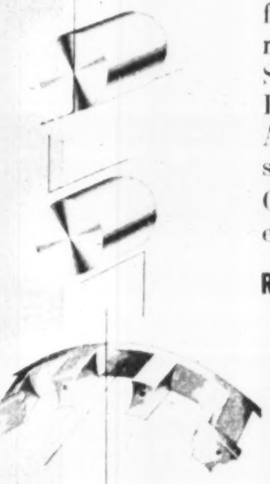
Unwavering right-line rotation . . . that's the immediate result of inbuilt trueness in Rollway roller bearings. There's no skew, no side-shock, no roller-end-drag. Internal forces are balanced by matchless precision in related parts. Bores are precisely cylindrical. Separator surfaces are rigorously parallel. Roller ends are truly square on every diameter. And bearing surfaces match both the separator slots and the roller races.

Over the long run, life expectancy is greatly extended. Cost per unit of time falls sharply.

RIGHT-ANGLE
ROLLER ENDS, precisely square to avoid end-rub, oscillation and side-shock.

RIGHT-ANGLE
BEARING SURFACES with parallelism that results in unwavering rightline rolling.

RIGHT-ANGLE
SEPARATOR SLOTS accurately machined to prevent roller skew, slide and uneven wear.



Rollways Roll Right Because They're Made Right

Let our engineers help you to select the Rollway bearing that is exactly right for your application. Our years of specialized bearing experience and complete engineering and metallurgical service are always at your command. No cost. No obligation.

Nationwide Replacement Service: Rollway bearings are available for replacement through authorized bearing distributors in principal cities. To locate, consult classified 'phone directories under BEARINGS. Rollway Bearing Co., Inc., Syracuse 4, N. Y.

SALES OFFICES

SYRACUSE	DETROIT
PHILADELPHIA	CLEVELAND
BOSTON	LOS ANGELES
PITTSBURGH	HOUSTON

ROLLWAY
BEARINGS
Complete Line of Radial and Thrust Cylindrical Roller Bearings

Best Buy

AEROQUIP 1503

...Here's Why!

Aeroquip Detachable, Reusable Fittings reduce hose line inventory. For on-the-spot replacements cut bulk hose to required length and attach fittings.

Unique Fitting design provides quick, easy assembly and assures positive grip on hose. No adjusting is required after assembly.

Hose is constructed of seamless synthetic rubber compound reinforced with two cotton braids and a high tensile steel wire braid.

Wide range of male and female end fittings in all sizes meet practically every requirement. Fittings are designed to SAE and JIC specifications.

Tough, durable Aeroquip Hose Lines are fire resistant. They perform satisfactorily at extreme temperatures—from —40° to +275° F.

Aeroquip Hose Lines are widely used with hydraulic fluids, lubricants, water, gasoline, Diesel fuel, air, and many other fluids.

Always first

AEROQUIP FLEXIBLE HOSE LINES OUTSELL ALL OTHERS
FOR INDUSTRIAL AND AIRCRAFT APPLICATIONS

Aeroquip

AEROQUIP CORPORATION, JACKSON, MICHIGAN

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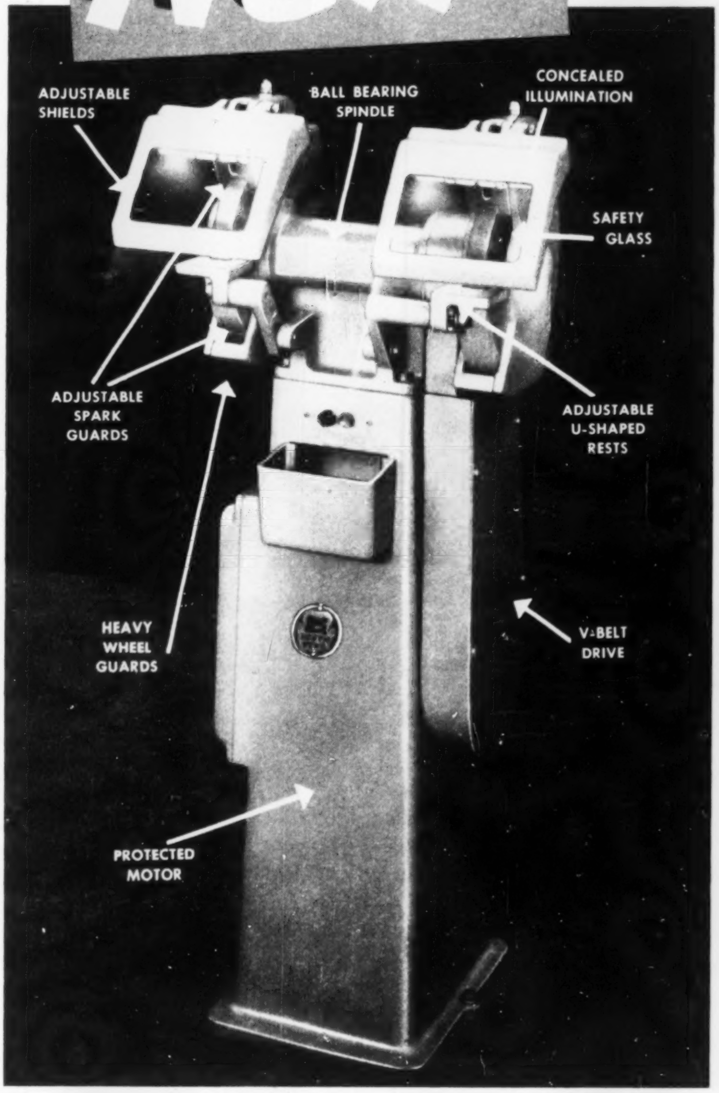
AEROQUIP PRODUCTS ARE FULLY PROTECTED BY PATENTS IN U.S.A. AND ABROAD

New SOUTH BEND Pedestal GRINDER


ADJUSTABLE SHIELDS
BALL BEARING SPINDLE
CONCEALED ILLUMINATION
SAFETY GLASS
ADJUSTABLE SPARK GUARDS
ADJUSTABLE U-SHAPED RESTS
HEAVY WHEEL GUARDS
V-BELT DRIVE
PROTECTED MOTOR

You will find this new grinder ideal for precision tool grinding. It is ruggedly built throughout to withstand hard service. The motor is enclosed in the pedestal and drives through a V-belt which removes the load and weight of the grinding wheels from the motor bearings, practically eliminates vibration and isolates the motor from abrasive dust.

Send coupon for complete information on this grinder that will give you long, trouble-free service.

SPECIFICATIONS

Wheel Size: 8" dia. (½ h.p. motor), 10" dia. (¾ h.p. motor).

Spindle: Approximate speed 2450 r.p.m. Sealed ball bearings.

Motor: Standard 2875 r.p.m. 50 cycle or 3450 r.p.m. 60 cycle, also D.C.

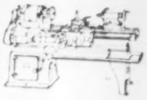
Over-all Dimensions: 8" Grinder, 49½" high, 18" wide, 20½" deep. 10" Grinder, 49½" high, 18½" wide, 20½" deep.

SEND INFORMATION CHECKED:

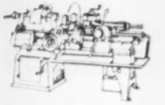
☐ SOUTH BEND GRINDER

☐ TOOLS & ATTACHMENTS

☐ 9" and 10" BENCH LATHES



☐ 10" to 16-24" FLOOR LATHES



☐ ½" and 1" Collet TURRET LATHES

☐ 14" DRILL PRESSES

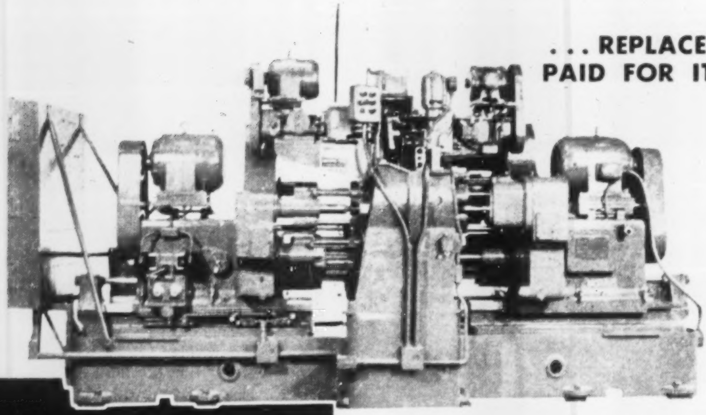
☐ 7" BENCH SHAPERS

Name ______________________ Company ______________________

Street ______________________ City & State ______________________

Building Better Tools Since 1906 • SOUTH BEND LATHE • South Bend 22, Indiana

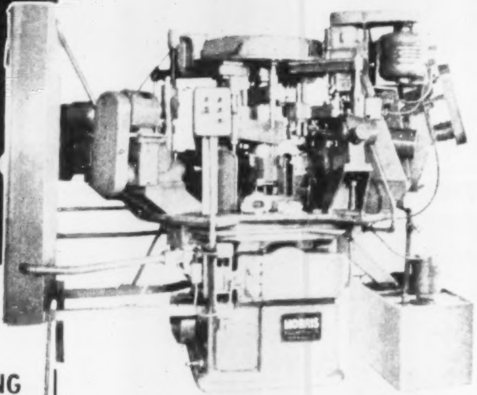
Want PRECISION PRODUCTION LIKE THIS?...



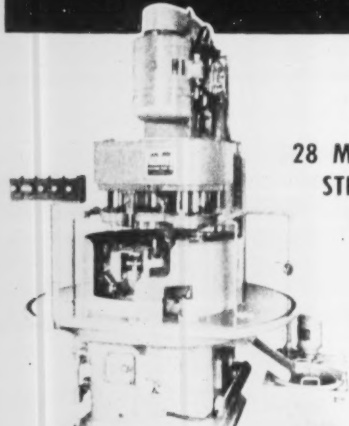
. . . REPLACED 6 OLD MACHINES PAID FOR ITSELF IN 39 WEEKS!

Thirty-eight drilling, reaming, countersinking, radius forming and tapping operations are performed on refrigeration parts by this Two-Way Horizontal, Eight Station Automatic Indexing Machine. Production rate is 150 pieces per hour at 80% efficiency.

. . . 300 PIECES PER HOUR!



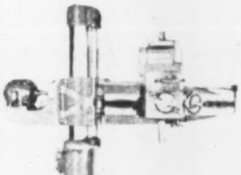
Either right or left hand carburetor air horns are drilled, faced and tapped . . . 22 operations . . . at a production rate of five per minute on this Six Station, Vertical Center Column Machine.



28 MACHINING STEPS IN 18 SECONDS!

Drilling, countersinking and reaming torque converter pump hubs, this Six Station Automatic Indexing Machine turns out 200 pieces per hour for a noted auto manufacturer.

Eliminate multiple handling and multiplied cost in multiple drilling, reaming, tapping and similar operations with Morris MOR-SPEED Production Machines. Morris Engineers will gladly prove that high precision production can be yours . . . with worth-while savings in time, labor and space. Write for additional details.



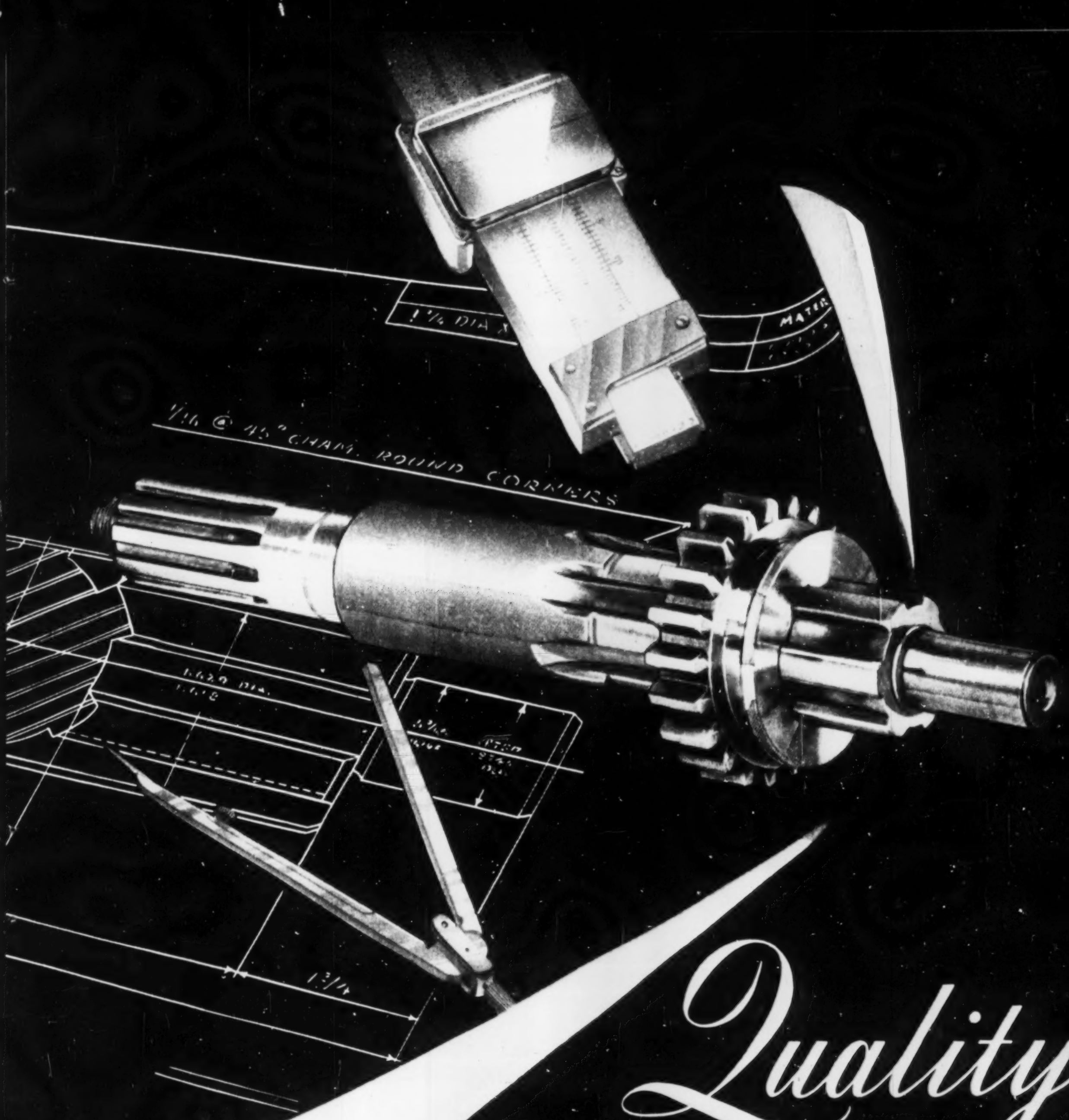
Morris also builds a line of 9 and 11 inch Column Radial Drills with outstanding features contributing to easy operation, sustained accuracy and long service life. Catalog on request.

Canadian Representatives:
THE JOHN BERTRAM & SONS CO., LTD.

Builders of MOR-SPEED Line

"A better product
at less cost—with
PRODUCTION *plus* PRECISION"

THE MORRIS MACHINE TOOL COMPANY
941 HARRIET ST., CINCINNATI 3, OHIO


1¼ DIA
1/16 @ 45° CHAM. ROUND CORNERS
MATER
1¾

Quality

CANNOT BE ARGUED INTO A GEAR!

"ILLINOIS GEAR" BUILDS IT IN . . .

A gear is right or a gear is wrong. There will be no argument — there will be no compromise with quality when you specify Illinois Gears.

Gears for Every Purpose ... **one gear or 10,000 or more**

ILLINOIS GEAR & MACHINE COMPANY

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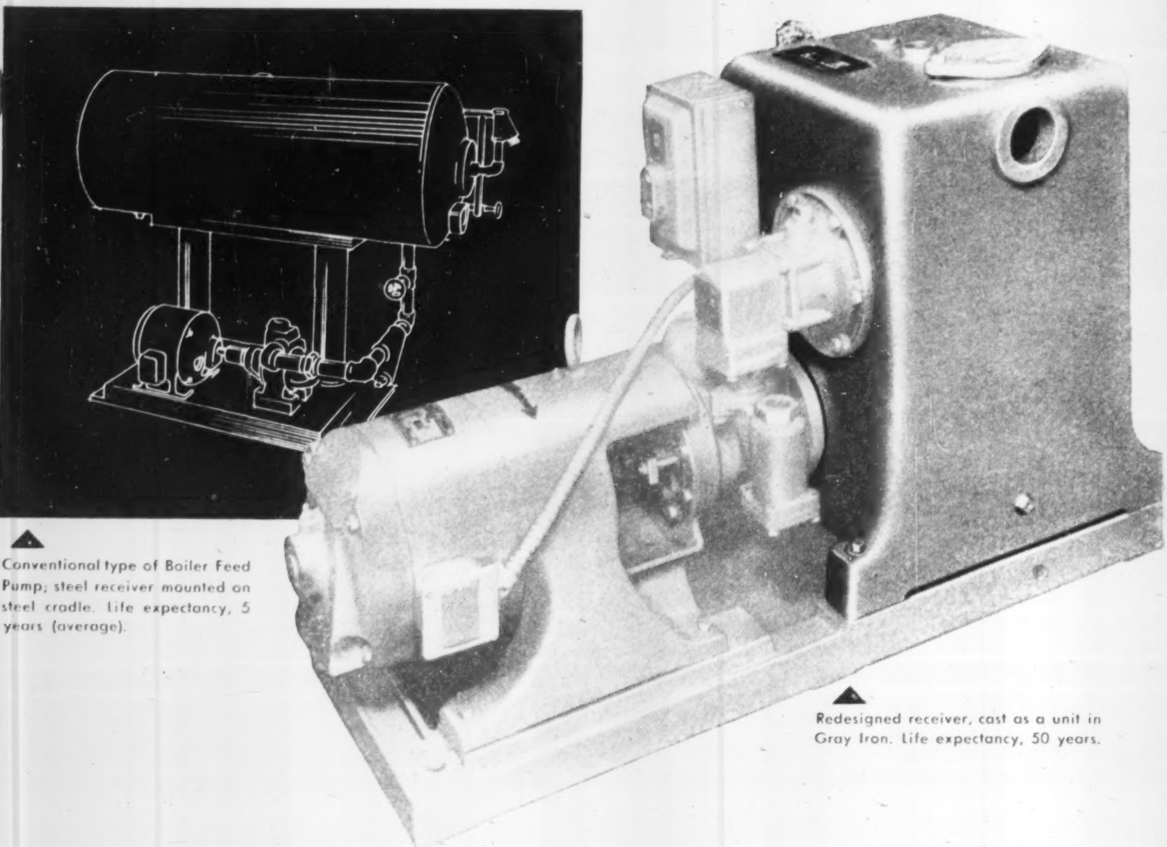


Conventional type of Boiler Feed Pump; steel receiver mounted on steel cradle. Life expectancy, 5 years (average).

Redesigned receiver, cast as a unit in Gray Iron. Life expectancy, 50 years.

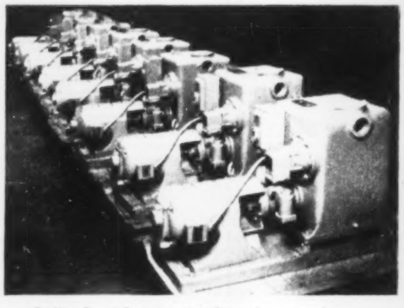
COST SAVINGS BUILT IN by practical use of GRAY IRON!

In Boiler Feed Pumps, first cost is less important than long-time economy. Because water conditions often cause certain materials to deteriorate rapidly, replacement costs are frequently high.

When a leading manufacturer replaced the conventional steel tank with a Gray Iron casting, here's what happened:

- In spite of somewhat higher initial cost, savings at the end of a 5-year period amounted to 38%—including replacement cost of steel tank, plus labor and fittings. This important saving in replacement cost will be realized every 5 years for approximately 50 years.
- By designing for the cast Gray Iron receiver and subbase mounting, space requirements were reduced—excess piping, valves and fittings were eliminated.

Have you analyzed *your* product for possible cost savings which can be accomplished by designing for and with Gray Iron? Write for technical information on the many advantages of the Gray Iron casting process.



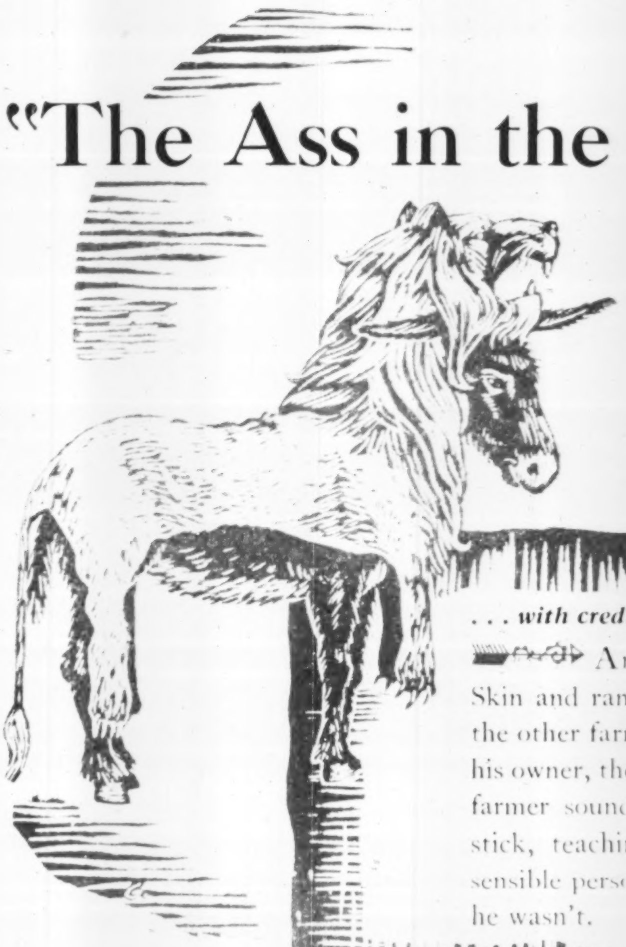
Boiler Feed Pumps with Gray Iron receivers, built for U. S. Navy.

Make it Better with Gray Iron . . .
Second largest industry in the metal-working field

GRAY IRON FOUNDERS' SOCIETY, INC.

NATIONAL CITY-E. 6th BLDG., CLEVELAND 14, OHIO

"The Ass in the Lion's Skin"



is a story for Cutting Fluid users

. . . with credit to Aesop, the Fable-Maker

An Ass dressed himself up in a Lion's Skin and ran about scaring the daylights out of the other farm animals. Then he tried to frighten his owner, the farmer. That was his downfall. The farmer soundly beat the stupid ass with a big stick, teaching him that he couldn't fool any sensible person by parading around as something he wasn't.

The Moral:

Different types of cutting fluids have their respective places in machining. Dressing a coolant up in a "Lion's Skin" doesn't change its capabilities. For example, if you have a difficult broaching job on a soft, tough steel *more than a "coolant" is needed.* You need the high *anti-weld* properties, the high *lubricity* and the superior temperature regulating qualities of a product like Stuart's ThredKut 99.

Stuart offers you a combination of time-tested products and wide experience in their application. You gain from this fewer rejects, longer tool life and greater production—often with *fewer* different cutting fluids in your plant. Ask to have a Stuart Representative demonstrate how he can save you time, money and material.

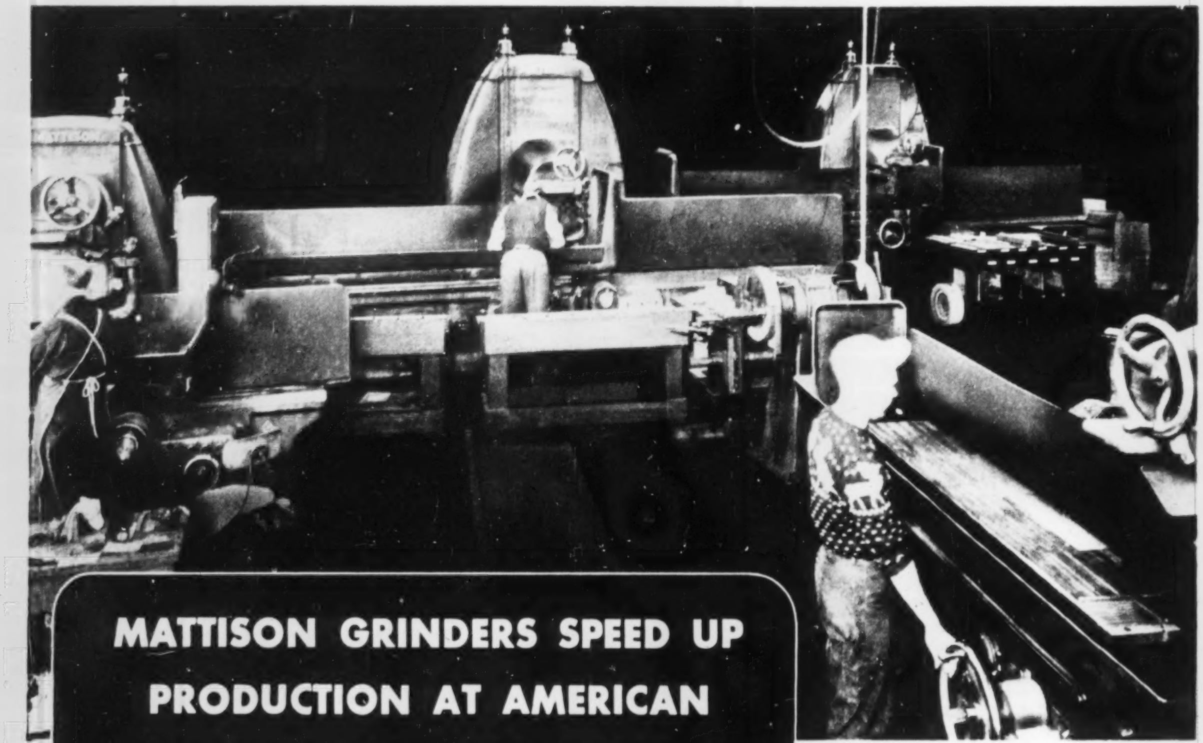
More Than a "Coolant" is Needed

D. A. Stuart Oil co.
EST. 1865 LIMITED
TIME-TESTED CUTTING FLUIDS AND LUBRICANTS
2735-37 S. Troy St., Chicago 23, Ill.

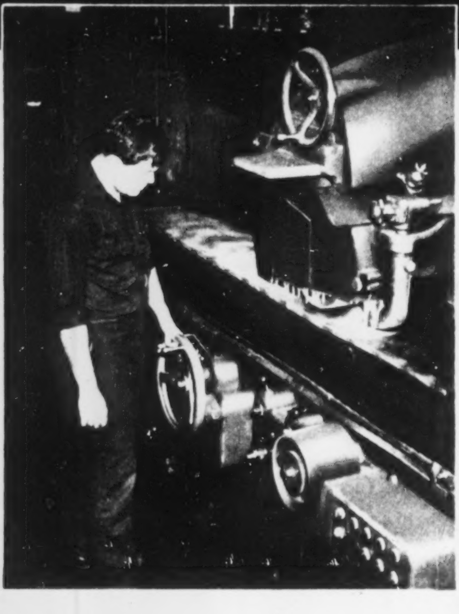
SEND FOR BOOKLET ***entitled More Than a "Coolant" is Needed***
CLIP TO YOUR COMPANY LETTERHEAD AND MAIL
to D. A. Stuart Oil Co., Ltd., 2735-37 S. Troy St., Chicago 23, Ill.

Your Name ....

Title ....



MATTISON GRINDERS SPEED UP PRODUCTION AT AMERICAN SAW & MFG. COMPANY

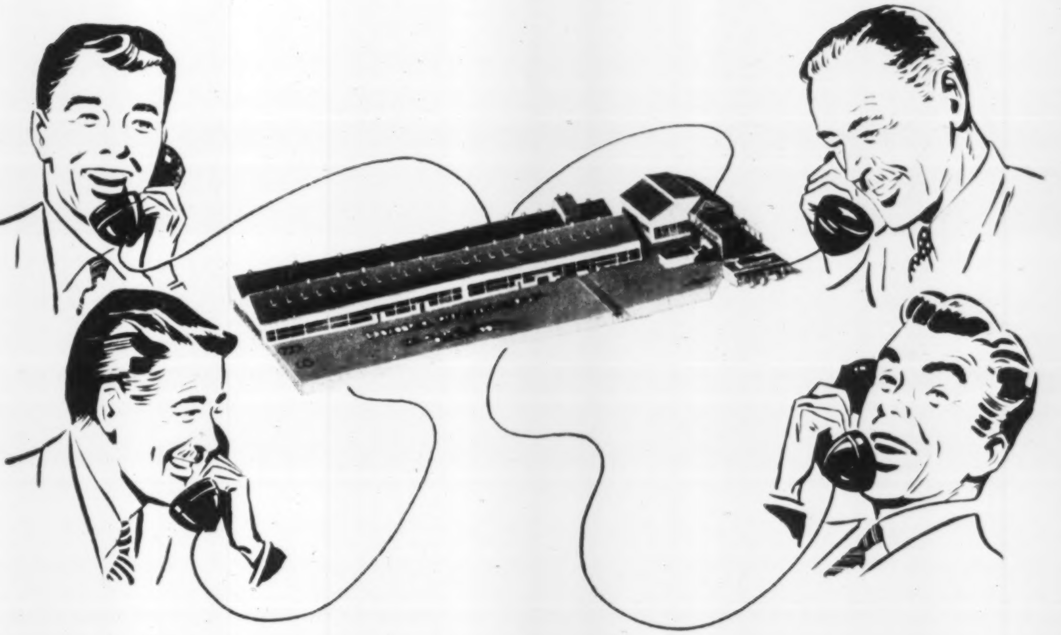


● The four Mattison High Powered Precision Surface Grinders shown above are used by American Saw & Mfg. Company for the grinding of annealed tool steel strips and bars on a real production basis in the manufacture of Lenox Precision-Master Ground Flat Stock. Exacting manufacturing specifications demand excellent finishes within close limits of accuracy.

The massive double column support, high power and rigidity of construction of the Mattison Grinder combine with accuracy and speed of operation to insure consistent precision results on a high production basis for American Saw & Mfg. Company. For complete information regarding the capabilities of the Mattison High Powered Precision Surface Grinder send for free circular.

MATTISON MACHINE WORKS

ROCKFORD • ILLINOIS



Save Time on Every Tubing Purchase and Get Better Quality

Sizes and Analyses

TUBING

SEAMLESS CARBON
MT—1015, 1020, 1025
Round: 3/16'' O.D. to 2¾'' O.D.
Square: ¼'' to 2'' O.D.

SEAMLESS ALLOY
4130—NE 8630
Round: 3/16'' O.D. to 3¾'' O.D.
Square: ¼'' to 2'' O.D.

CHROME
4%-6%, 6%-8%, 8%-10%
3/16'' to 1⅞'' O.D.

STAINLESS STEEL
Seamless and Welded
Types 304, 316, 321, 347
Round: ¼'' to 2⅞'' O.D.
Square: ¼'' to 1⅞'' O.D.
WELDED CARBON TUBING
¾'' to 3'' O.D.

BARS

C-1018, B1113, G1137, FS1117
COLD FINISHED
3/16'' to 2½''

For Other Shapes, Contact Mill

PHONE PACIFIC

From milk processors to machine-tool builders . . . from aircraft to soda-fountains . . . more and more manufacturers, in more and more industries, are turning to Pacific for top-quality tubing. They want materials to be precise in analyses, exact in dimensions and adherent to specifications, and they know that Pacific gives them what they want . . . at the right price! And on-time, every time!

If you need stainless, carbon, or alloy steel tubing; welded, or welded and drawn tubing; or cold-finished carbon bars: Or if you need engineering or design advice from tubing experts you can profit by calling Pacific for the products or answers.

Get the complete Pacific Production and Service story today. Clip and mail the coupon below for the new Pacific Tubing booklet, or to have a Pacific representative call. You are not obligated in any way.

West Coast Distributors for:

Superior Tube Company, manufacturers of fine small tubing in all analyses from .010'' to 5/8'' O.D. and in certain analyses (.35'' max. wall) up to 1 3/8'' O.D.

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TUBE COMPANY

First Steel Tube Mill in the West

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☐ Please rush me your new Tubing Bulletin.

☐ Have your representative call.

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FIRM NAME______________________________

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SANDVIK HAS 785 SOLUTIONS TO SPRING STEEL PROBLEMS

Strip Steel Stocks Include 652 Cold-Rolled, Hardened and Tempered Sizes and 133 Cold-Rolled And Bright Annealed Sizes

There are 785 chances that you can get the exact type and size of steel you need, right "off-the-shelf" from Sandvik.

Sandvik is a source of spring steels with specialized physical properties, fine surface finish, precise and uniform gauge and high fatigue life. Whenever you want a spring steel with special performance ability, check with Sandvik first.

Sandvik high quality spring steels are available:

- **In straight carbon and alloy grades**
- **In special analyses for specific applications**
- **Annealed, unannealed or hardened and tempered**
- **Precision-rolled in thicknesses from .001"**
- **With bright finish or polished bright, yellow or blue**
- **With round edges or square edges**
- **In a wide range of widths**

THIS NEW SANDVIK CATALOG IS YOURS FOR THE ASKING

Catalogues 785 sizes. Gives thickness, width, hardness, types of edges and weight in pounds per hundred feet. Includes useful reference tables. Size 8½" x 11". Write, on your letterhead, for your free copy.

Sandvik Quality Steels

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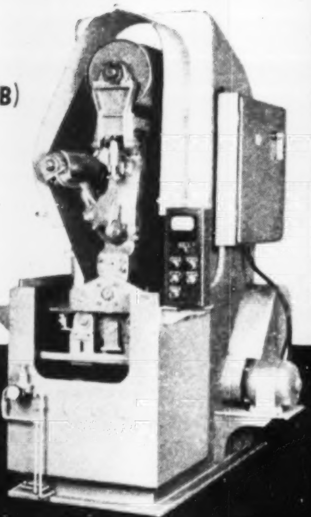
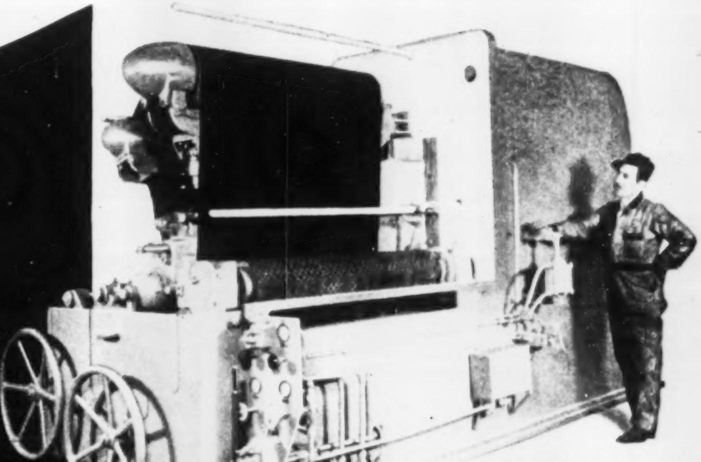
SANDVIK CANADIAN LTD., P.O. BOX 40, STATION O, MONTREAL 9, P. Q.

(B)





(A)

IF THE STOCK IS FLAT

MICRO-POLISH

can automatically finish your job faster, better or cheaper regardless of size, shape or material.

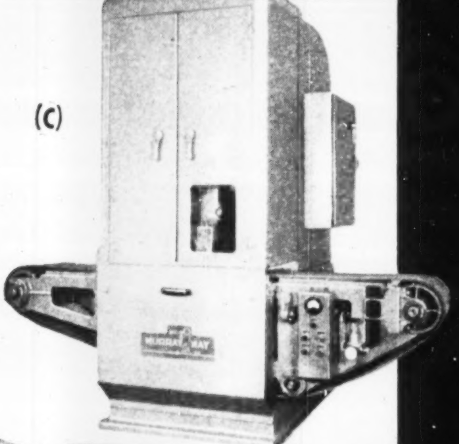
Murray-Way, "engineered-to-the-job", Micro-Polish equipment is now being used the country over in every type of application, on every conceivable kind of material.

Micro-Polish is an amazingly versatile and consistently successful automatic polishing method useful on any job from the prepolishing of low grade steel sheet, to meet high quality job specifications, to the production sharpening and polishing of pruning tools.

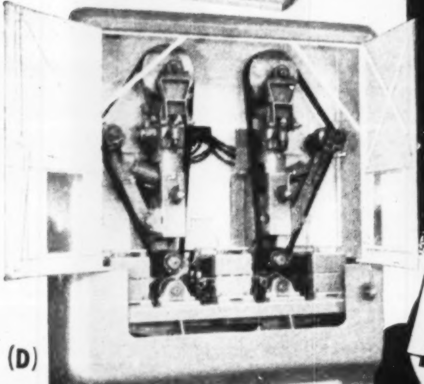
Micro-Polish can precision finish any size, shape or length of sheet, strip or blanked stock in ferrous or non-ferrous metals, wood, fiber, plastic, rubber or leather, by wet or dry process.

The typical Micro-Polish equipment shown here demonstrates how Murray-Way engineers have adapted the process to individual job requirements.

(C)



(D)



A A Micro-Polish giant used in reclamation grinding of steel strip.

B One of our smaller units used in polishing narrow bi-metal stock.

C A versatile unit using belt conveyor to polish a variety of flat stampings and forgings.

D A space saver unit for polishing flat bar stock. Two heads and two grades of belt grain accomplish the complete job without rehandling.

Murray-Way engineers will gladly show you how this time and cost saving method can improve your polishing operation.

MURRAY WAY

THE MURRAY-WAY CORPORATION
POST OFFICE BOX 180 — BIRMINGHAM, MICHIGAN

AUTOMATIC POLISHING, BUFFING, GRINDING EQUIPMENT

Versatility Counts—

THESE ***FORGINGS*** DONE ON A NAZEL ELECTRO-PNEUMATIC

FORGED OXYGEN FREE HIGH CONDUCTIVITY COPPER END RINGS
FORGED AND FINISH MACHINED K MONEL HOISTING PADS
P
PHILADELPHIA BRONZE AND BRASS CORPORATION
FORGINGS AND CASTINGS FOR YOUR ENGINEERING NEEDS
CERTIFIED COPPER
MALLORY 3
MALLORY 53B
MALLORY 83
COPPER ALLOYS
High Conductivity
FORGINGS
MALLORY ALLOYS
O.F.H.C. COPPER

Forgings shown at top, left, are oxygen-free high conductivity copper end rings; those at right are finish machined K Monel Hoisting pads . . . these Forgings readily produced on a NAZEL Electro-Pneumatic Hammer by Philadelphia Bronze & Brass Corp. . . . and as displayed at the National Metal Exposition, October, 1952, Philadelphia.

Hammer, Air Compressor and Electric Motor are "all one" — therefore, the NAZEL requires no boilers, compressors, tanks, piping, fuel, ash handling, shafting, pulleys, hangers, etc.

The NAZEL Hammer can be started or stopped at the mere push of a button, and it uses power **only when working** (think what this means in comparison with other types of hammers).

Low upkeep cost and **high efficiency** are outstanding features of the NAZEL.

To meet Industry's varied Forging Requirements . . . we produce the NAZEL Hammer in 5 different types and 16 sizes . . . forging steel billets up to 12" x 12".

1836

LOBDELL UNITED COMPANY

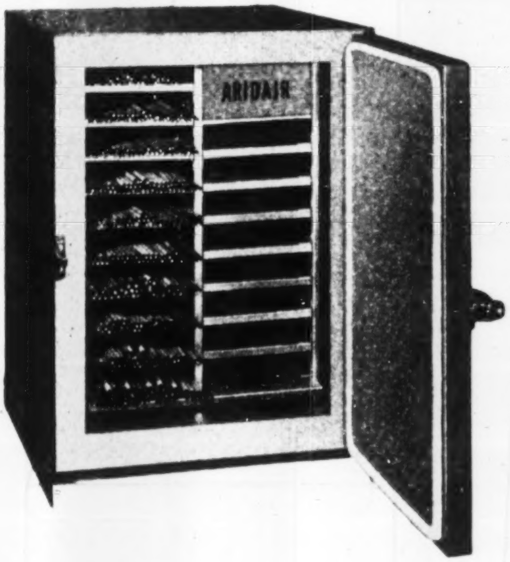
WILMINGTON 99, DELAWARE
A SUBSIDIARY OF UNITED ENGINEERING AND FOUNDRY COMPANY

1953

BLUEWELD

Aridair

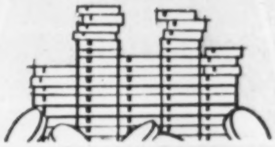
ELECTRODE
Moisture Content
STABILIZER



worth its weight in gold

FOR

Low Hydrogen and Stainless Steel Electrode Arc Welding Applications



Specifically designed and engineered to maintain correct moisture content.

EXCLUSIVELY ARIDAIR

- *Chemically dried air*
- *Shelf circulation*
- *Electrically heated*
- *Thermostatically controlled*
- *Recessed shelving*
- *Rigid construction*
- *Multiple unit stacking*

Fred C. Archer, Inc.

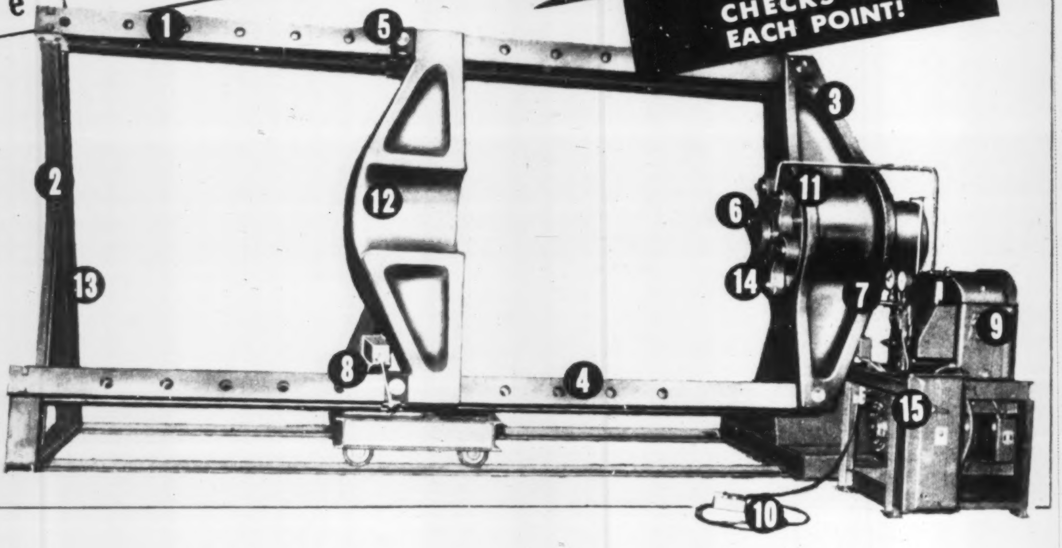
MANUFACTURER
MILWAUKEE 3, WISCONSIN

when you choose a FORCING PRESS...

YOU WANT THESE QUALITIES

a	RUGGED, LONG-LIFE CONSTRUCTION	✓	1 Cold rolled steel tension members. 2 Rigid support frame—solidly welded. 3 Head and abutment members of finest alloy cast steel—heat treated. 4 Accurately machined bearing block pin holes.
b	SIMPLICITY AND SPEED OF OPERATION	✓	5 Free moving bearing blocks firmly positioned by a single steel pin. 6 Spring return or double acting rams. 7 Working pressure always visible with remote control. 8 Hand winch moves abutment truck smoothly for quick positioning.
c	ACCURATE POSITIVE PRESSURE CONTROL	✓	9 Selective, positive pressure adjustment control. 10 Remote control assures greater accuracy.
d	FLEXIBILITY TO PERFORM A VARIETY OF JOBS	✓	11 Press Cylinder removable as a unit for special jacking or pulling operations. 12 Nested yoke adaptors available in various sizes for any model press. 13 Open end design provides ample clearance for long material. 14 Extra long ram travels available.
e	EASY MAINTENANCE AND SERVICING	✓	15 Separate pump and cylinder units simplify press assembly—allow quick inspection and servicing.

HERE'S HOW RODGERS CHECKS ON EACH POINT!



You'll find all these features and more on every Rodgers Forcing Press you compare, whether you choose the 600 ton Press shown here, or any of the other models ranging from 100 tons to 600 tons. They are available with either hand pumps or a selection of power driven pumps. On models up to 200 tons, 13 inch spring return cylinders are standard. On models 200 tons or more, 26 inch double acting cylinders are standard but longer ram travels up to 48 inches are available. You'll find complete details in the new Rodgers Forcing Press Catalog. Write for your copy today — and then compare!

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7423 Walker St., St. Louis Park, Minneapolis 16, Minn. **HYDRAULIC POWER EQUIPMENT**

MELTRITE

PIG IRON

Making MELTRITE
Beginning of a cast
of molten iron.

A STANDARD
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MORE USED THAN ANY OTHER MERCHANT PIG IRON

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70 years of
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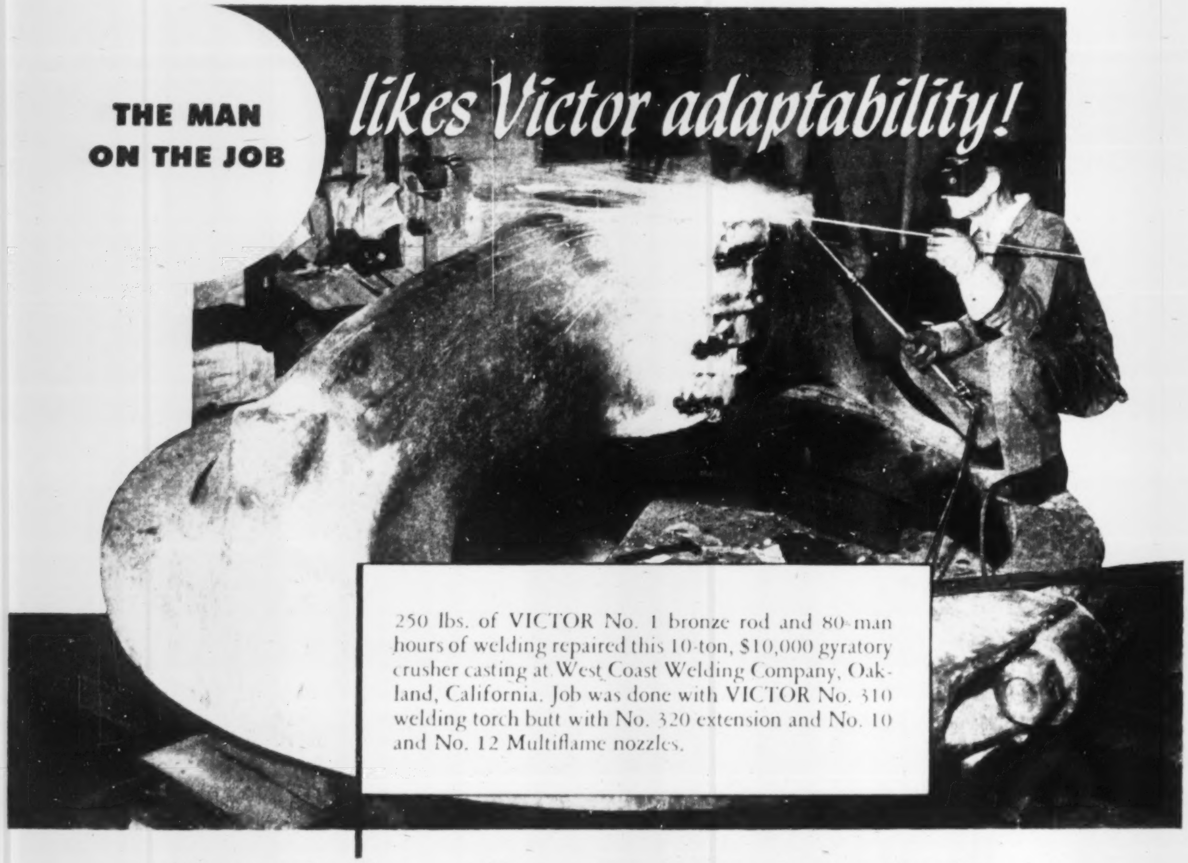
GREENSBORO • INDIANAPOLIS • MINNEAPOLIS • ST. LOUIS • WASHINGTON

IRON ORE • PIG IRON • COAL • COKE

THE MAN ON THE JOB *likes Victor adaptability!*



250 lbs. of VICTOR No. 1 bronze rod and 80-man hours of welding repaired this 10-ton, $10,000 gyratory crusher casting at West Coast Welding Company, Oakland, California. Job was done with VICTOR No. 310 welding torch butt with No. 320 extension and No. 10 and No. 12 Multiflame nozzles.

Whatever the job . . . welding, cutting, heating, brazing, descaling . . . you'll start it quicker, finish it sooner with versatile VICTOR equipment.

Here's why:

- HAND-TIGHT QUICK-CHANGE nozzles and cutting attachments are on or off with a twist of the wrist—no wrench needed!
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- EFFICIENT MIXING in VICTOR'S exclusive spiral mixer and gas proportioner means peak performance at every setting, with every type of VICTOR nozzle.

LOOK FOR THE VICTOR DEALER SIGN

Ask him to show you why it *pays* to standardize on VICTOR.

VICTOR

Welding and Cutting Equipment
Since 1910

GET THE FACTS—AND YOU'LL GET VICTOR

297

VICTOR EQUIPMENT COMPANY

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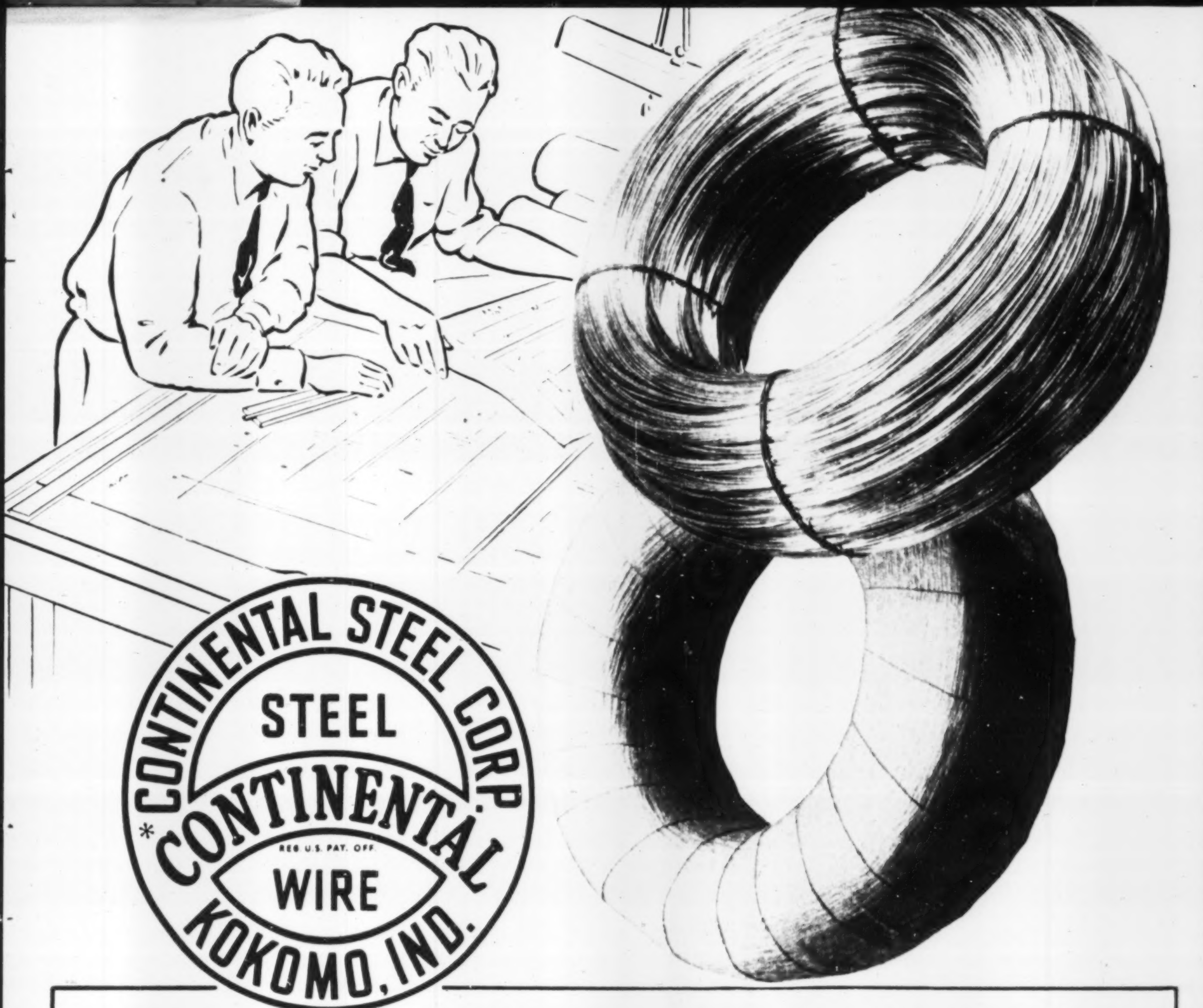
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Why should you spend your time and money—trying to find a wire to meet some product need? Let Continental help you! The right wire can help cut product costs . . . can improve performance and product life. Users who depend on Continental know they are getting wire with a good service record. It will pay you to check with Continental for the wire you need . . . and for helpful wire service. Call Continental when you have your next wire problem.

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GENERAL OFFICES • KOKOMO, INDIANA

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What do you do when you don't have the right size v-belt in stock?

①

Contact your supplier for a replacement

. . . and wait for delivery
. . . wait—and watch production stay at zero

②

Send someone to get the required belt

. . . and pay your employee while he goes for the belt
. . . pay through loss of production

③

Stock VEELOS . . .

. . . and always have the *right* size belt when you need it

. . . any length can be made up from a 100-foot reel

. . . inventory is automatically maintained

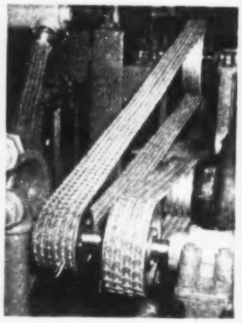
. . . available from 350 distributors

GET ALL THE FACTS

This Veelos Data Book gives complete details about construction, installation and uses. Write for free copy of this money-saving book today.

**MANHEIM MANUFACTURING
& BELTING COMPANY
613 Manbel St., Manheim, Pa.**

VEELOS in stock is Production Insurance



Belts for replacement always on hand—just 4 reels of Veelos in the 0, A, B and C widths can replace up to 316 different sizes of endless v-belts.

Link construction permits quick installation—without removing outboard bearings.

Adjustability provides controlled tension on each belt—vibrationless, full power delivery is assured.

VEELOS
THE LINK
V-BELT

ADJUSTABLE TO ANY LENGTH · ADAPTABLE TO ANY DRIVE

Made in all widths in three types: regular, oil-proof, static conducting. Also double V in 0, A and B. Packaged on reels in 100-foot lengths. Sales engineers in principal cities; over 350 distributors throughout the country. VEELOS is known as VEELINK outside the United States.

UNITED 14,000 TON FORGING PRESS

UNITED

ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

Plants at Pittsburgh • Vandergrift • New Castle
Youngstown • Canton

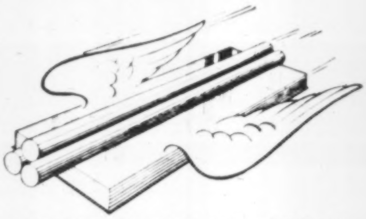
Subsidiaries Adamson United Company, Akron, Ohio
Lobdell United Company, Wilmington, Delaware
Stedman Foundry and Machine Company, Inc.,
Aurora, Indiana

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other Heavy Machinery. Manufacturers of Iron, Nodular Iron and Steel Castings, and Weldments.

Which of these special-purpose steels do you need...*NOW*?

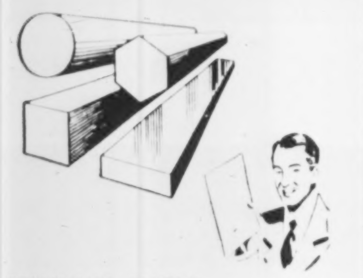
Call Ryerson for Quick Shipment

Right now, users of special purpose steels can get most of their requirements quickly—with one call to one convenient source. All the steels described on this page are in better-than-average supply at the Ryerson plant near you. All are high quality steels that conform to exacting specifications. Use this page to check the items *you* need, and save time by ordering them next time you call Ryerson.



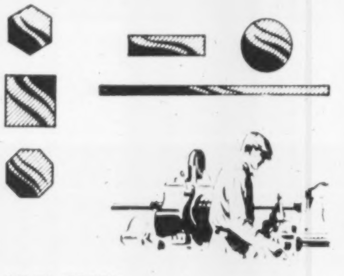
AIRCRAFT ALLOYS AND STAINLESS

Alloy bars, sheets and strip in more than 400 sizes, finishes, conditions. Stainless in more than 300, to meet all important aircraft specs.



STANDARD ALLOYS

Rounds, flats, hex's, squares—hot rolled and cold finished—complete heat treatment guide with each shipment.

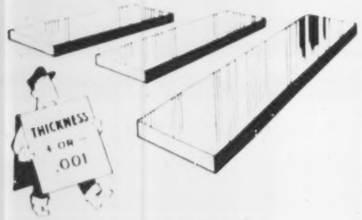


TOOL STEEL

Water, oil or air hardening tool steels. High in quality; economical in price. Hardening data with every shipment.

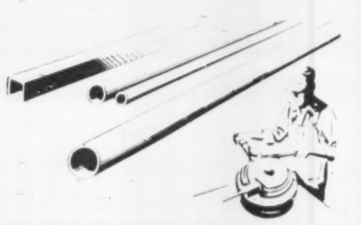
STRAIGHT CHROME STAINLESS

No allotment required for these stainless bars, plates and sheets. Can often replace restricted nickel-chrome types.



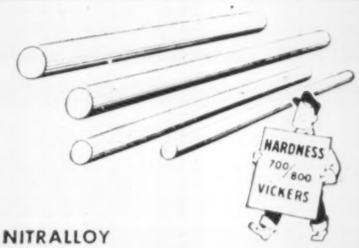
GROUND FLAT STOCK

High grade, non-deforming tool steel. Saves machining, speeds production. For accurate-to-size parts, tools, dies.



WELDED MECHANICAL TUBING

Hot and cold rolled, rounds and squares in a wide range of sizes. Consider cost—substitute for seamless tubing.



NITRALLOY

Develops extremely high surface hardness after nitriding. Unequalled for parts subject to abrasion. Large stocks.

OTHER PRODUCTS: CARBON STEEL BARS, STRUCTURALS, PLATES, SHEETS, ETC.

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The Metalworking Outlook

CAPSULIZED FORECAST
OF THINGS TO COME

January 5, 1953

The Future Looks Good

Sales of metalworking products can reach an alltime high of $115 billion in 1953, compared with $111 billion in 1952. That increase—based on the assumption of no major strikes and no all-out war—is nearly a 4 per cent gain both in dollars and in physical output over 1952 because the price level should remain fairly stable over the next 12 months. Gross national product (value of all goods and services) should rise from $344 billion in 1952 to about $350 billion in 1953. The Federal Reserve Board's industrial production index may average about 220-225, compared with 217 in 1952. Personal income after taxes in 1953 should hit about $240 billion, only a little higher than the $234 billion in 1952.

Tough Competition in 1953

The coming year will be characterized by more competition, more emphasis on selling and distribution and less on production. Controls on materials, prices and wages will continue to erode away and will no longer be bothersome by midyear. The first half will see better business weather than the second, but there will be nothing like a recession at any time. The Eisenhower victory has brought new warmth to the economic climate which should last through 1953.

Construction, War and Steel

The major, more tangible factors bringing sunny skies to business throughout the coming year will be heavy construction, rising defense expenditures and a probable record steel output. New plant and equipment expenditures in the next 12 months will decline slightly to $26.5 billion from $26.9 billion in 1952, but total construction will be a record $33 billion colossus in 1953. Military expenditures are now at a rate of $50 billion a year and will rise still more. The current rate compares with $40 billion in 1951. Going full steam all next year, the steel industry will be able to produce about 117 million tons of ingots, compared with 93.1 million in 1952 and 105.2 million in 1951. Mills will produce at capacity for the next six months, but output will slip a little in the last half.

Industry-by-Industry Prospects

Steel consuming industries will fare about this way:

CONSTRUCTION—On the increase will be building for commercial, social, recreational, highway, sewer, pipeline, utility, military and atomic energy projects. On the decrease will be industrial, housing and irrigation construction. Little change will develop in other types.

AUTOMOBILES—The U.S. industry expects to turn out 5 million cars and 1.2 million trucks in 1953, compared with 4,332,000 cars and 1,222,000 trucks in 1952.

RAILROADS—Look for improvement in the railroad equipment field. Freight car shipments averaged only about 6350 a month in 1952, but prospects are promising that production will reach 10,000 a month by the fourth quarter. Diesel engine production should hold at current levels.

SHIPBUILDING—Shipbuilding in 1953 will be about the same as in 1952, a minor phase of total metalworking production that consumes only about 1 million tons of steel a year.

AIRCRAFT—Some 12,000 military aircraft will be turned out in 1953, compared with a little more than 9000 in 1952. That means a $5.5 billion sales volume to the military in the coming year, compared with $4.3 billion last. Commercial production remains a dribble.

OIL AND GAS EQUIPMENT—The peak in expansion comes this year. The gas industry alone plans to spend $1.7 billion on new plant and equipment, compared with $1.2 billion in 1952. Total output of tubular goods in 1953 will hit about 1,780,000 tons, nearly 1 million tons short of what Petroleum Administration for Defense claims is needed.

MINING, QUARRYING AND LUMBERING—Expect continued high activity here, but down a little from the 1952 high.

MACHINERY AND TOOLS—Production in this field will be high, but probably a shade under the 1952 level. Machine tool output hit $1.2 billion last year, but backlogs are falling, as they are for most capital goods makers. Tool builders now have about 11 months of work ahead, compared with 18 months in January, 1952.

ELECTRICAL EQUIPMENT—To-the-hilt production all year. Watch for some capacity increases by electronics makers who last year did a record $4 billion business.

APPLIANCES—Dollar sales of appliances can set a record of $3.7 billion in 1953, but unit production will be off from the peak output in 1950. The only appliances that will do better will be the newer items.

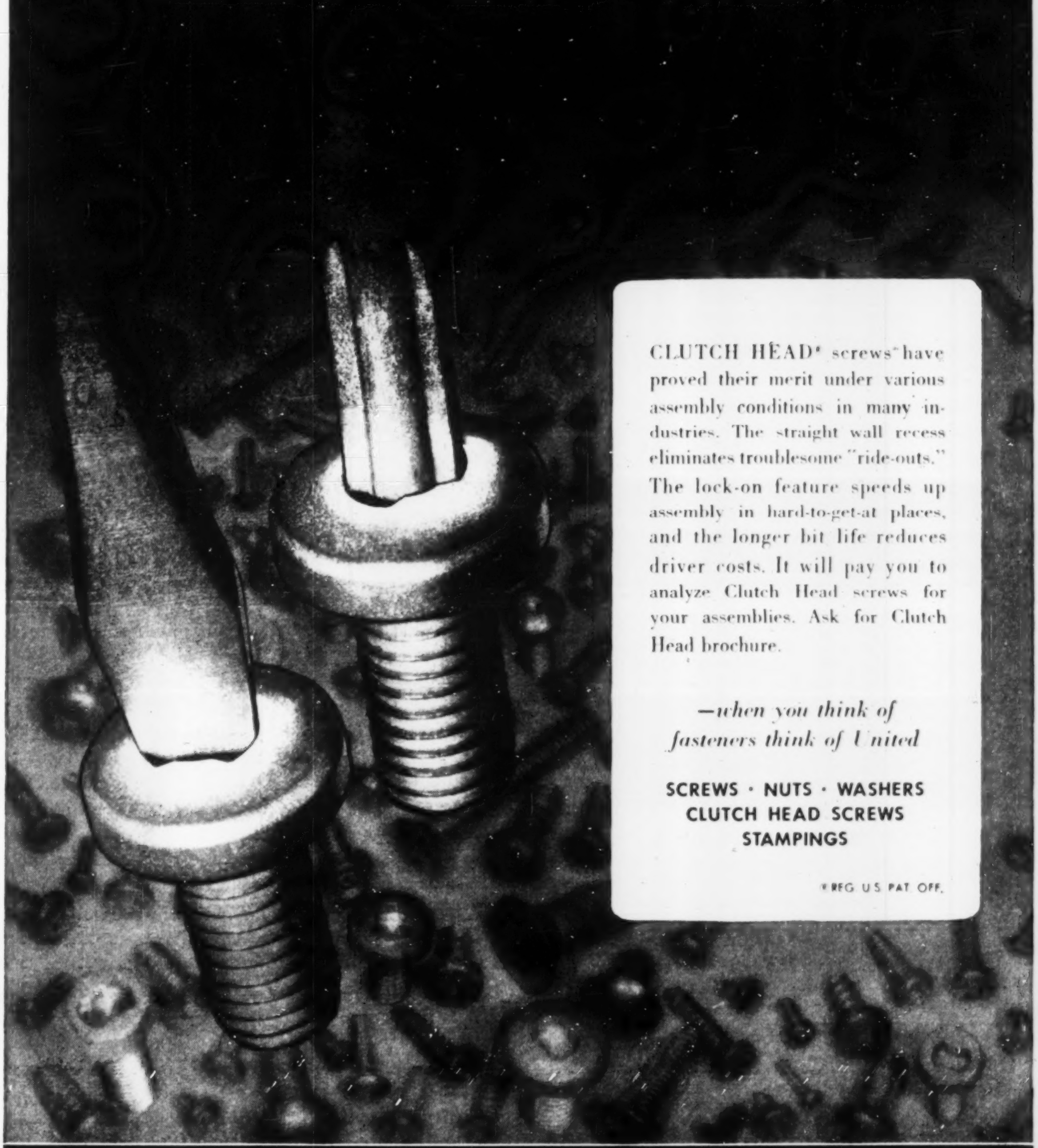
FARM MACHINERY—Declining farm income and saturated markets will cut farm machinery sales to about $1.8 billion in 1953, compared with $2 billion in 1952 and the record $2.2 billion in 1951.

STEEL CONTAINERS—This industry will experience increased activity in 1953, especially in nonfood cans.

MILITARY ORDNANCE—A slight increase in activity, especially in ammunition production.

IMPORTS AND EXPORTS—Resign yourself to declines in both categories. Currency troubles, tariffs and our high costs discourage exports, and our tariff walls hamper imports.

UNITED
CLUTCH HEAD SCREWS



CLUTCH HEAD* screws have proved their merit under various assembly conditions in many industries. The straight wall recess eliminates troublesome "ride-outs." The lock-on feature speeds up assembly in hard-to-get-at places, and the longer bit life reduces driver costs. It will pay you to analyze Clutch Head screws for your assemblies. Ask for Clutch Head brochure.

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United Screw and Bolt Corporation
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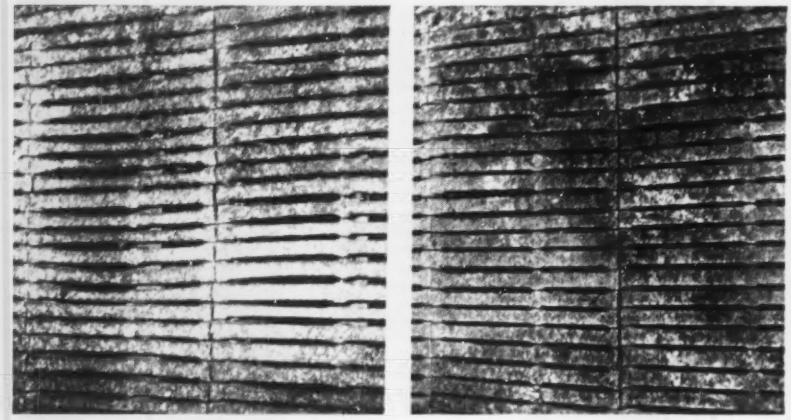
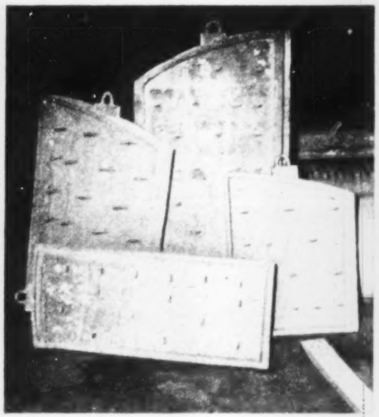


COMPARISON OF GRATE MATERIAL

Gray iron sintering grates, at left, show bad scaling and warpage after a single month of use.

Note good shape of Ductile Iron grates, above, after same service. They greatly outlasted gray iron grates.



DUCTILE IRON FURNACE DOORS SAVE MONEY, TIME AND LABOR In ordinary iron, exposed to high temperature, internal oxidation easily penetrates along paths of flake graphite, thus causing destructive growth. Penetration is curbed in Ductile Iron, since its graphite is wholly in spheroidal form.

DUCTILE IRON Sintering Grates and Furnace Doors

excel in elevated temperatures

Performance Records Show Outstanding Heat-Resistance of this New Material.

Tests show that iron containing graphite wholly in spheroidal form provides notably greater growth resistance than ordinary gray iron.

FOR INSTANCE: Gray iron and Ductile Iron grate bars in the Greenawalt sintering system of a merchant pig-iron producer gave the following performances:

At the Canadian Furnace Company, Ltd., in Port Colborne, Ontario . . . from date of their installation, August 1950, to June 1951 . . . no Ductile Iron grates needed replacements although 150 gray iron grates had to be replaced after 6 weeks' service.

The International Nickel Company, Inc.
Dept. S, 67 Wall Street, New York 5, N. Y.
Please send me a list of publications on:
DUCTILE IRON
Name Title
Company
Address
City State

The sinter-plant foreman stated, "*The Ductile Iron grates still seem to be as good as new.*" Cast by Lakeside Foundry, Ltd., of Port Colborne, these Ductile Iron grates also out-performed steel grates tested previously.

ANOTHER EXAMPLE: The forging furnaces of a leading steel plant now have Ductile Iron doors supplied by United Engineering and Foundry Company, Pittsburgh 22, Pa. Gray cast iron doors which were subjected to 24 hours' continuous service daily, heat-cracked after an average life of about four weeks. A trial lot of annealed Ductile Iron doors lasted 17 weeks . . . or more than four times as long as those of gray cast iron.

APPLICATIONS: As cast, as well as heat-treated Ductile Iron parts . . . serving at elevated temperatures in scores of machinery, engine and furnace applications . . . provide a growth-resistance heretofore unavailable in gray cast iron.

AVAILABILITY: Send us details of your prospective uses, so that we may offer a list of sources from some 100 authorized foundries now producing Ductile Iron under patent licenses. Request a list of available publications on Ductile Iron . . . mail the coupon now.

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET
NEW YORK 5, N. Y.

AS THE EDITOR VIEWS THE NEWS STEEL

January 5, 1953

Tide, Taken at the Flood . . . .

A year ago the first sentence on this page read as follows: "Early dawn of 1952 witnesses confusion and distrust which make it easy to become discouraged about the future." Rewritten to fit today's conditions, the sentence should read: "Early dawn of 1953 witnesses an inspiring growth of faith and hope which augurs well for marked progress in the solution of national and world problems."

The sharp contrast between the outlooks for 1952 and 1953 is due in large measure to the collective judgment of American citizens who voted last November. They repudiated an administration that pursued a course definitely left of center and chose for their new leader a man whose policies will gradually swing the nation toward the right.

Encouraging developments have followed this decision. The President-elect has named his cabinet and numerous key advisers. Already most of them are working hard at their prospective duties. The public is responding enthusiastically to this unprecedented action. This contagious spirit of new hope has spread even to the ranks of new deal and fair deal advocates. In the fading days of the old year, many of them began to talk approvingly of economy, efficiency and other things which they had ignored or ridiculed for years.

In short, there is a new spiritual force at work throughout the nation. The dull feeling of frustration in men's minds is being replaced by a lively conviction that new leaders, new approaches to problems and new pep will be productive of success. Perhaps this is indeed "a tide in the affairs of men, which, taken at the flood, leads on to fortune . . . ."

Isn't this fortuitous circumstance a direct challenge to the leaders of industry to rise to a higher plane of statesmanship? For far too long a period American industry has been on the defensive. It has seldom been articulate except in negation against the proposals of others. Now is the time for industrialists to take the initiative in proposing constructive programs for the well-being of the nation, and by exemplary deed and action to prove to the public that they are sound and desirable.

EDITOR IN CHIEF

HARD WORK IS ANSWER: In connection with the opportunity discussed above, one wonders if industrial executives fully appreciate the extent to which the American public often distrusts the motives of industry.

A classic example occurred in the twenties when most steel companies were spending time, money and printer's ink in efforts to explain why the 8-hour day was "absolutely impossible." President Warren Harding called a few key steelmen to the White House and in no time at all they agreed to adopt the shorter work week. Naturally the major credit went to the President.

Similar situations have arisen frequently since then. In many instances the public has credited government officials, politicians or union leaders with the reforms. Often industry has been looked upon as an obstructionist which acceded reluctantly to outside pressure. In cases where industrial leaders have inaugurated constructive programs, the public has been niggardly in its praise.

Hard work is the only means of correcting this situation. If industry will put as much intelligent effort into public relations as it is devoting to technological progress, the man in the street soon will decide for himself that industry is more saint than sinner.

* * *

OBJECTIVE IS CREATIVE: One reason why American industry has found it so difficult to put its best foot forward is that there has been a rather noticeable lack of agreement as to how the job can be done best. At the recent annual meeting of the Magnesium Association, C. A. Campbell, vice president and general counsel of the Dow Chemical Co., offered advice on this point that merits careful consideration. He suggested "that we resolve to show the American people by our fiscal and economic policies that the competitive free enterprise of which we have spoken so highly does have creativeness and integrity and social responsibility . . . and that by our internal operational policies we do whatever is in our power to help our own people, our own employees, find incentive and creativeness and dignity."

* * *

THEY ARE OPTIMISTIC: Over the postwar years, the judgment of metalworking executives as to the future trend of business has been much more reliable than the forecasts of governmental and professional private prognosticators. The reason is not too strange. Responsible executives have to be realistic; the professionals are not held directly accountable for their opinions.

For these and other reasons we are impressed by the decidedly optimistic viewpoints expressed by the 1152 top metalworking executives who took the trouble to answer the questions of our editors (pp. 115-122) in regard to anticipated conditions in 1953. They look for a continued rise in production, greater employment, more industrial capacity, fewer materials shortages and slightly higher productivity per man. On the whole, they envision a rather promising 1953 for metalworking.

* * *

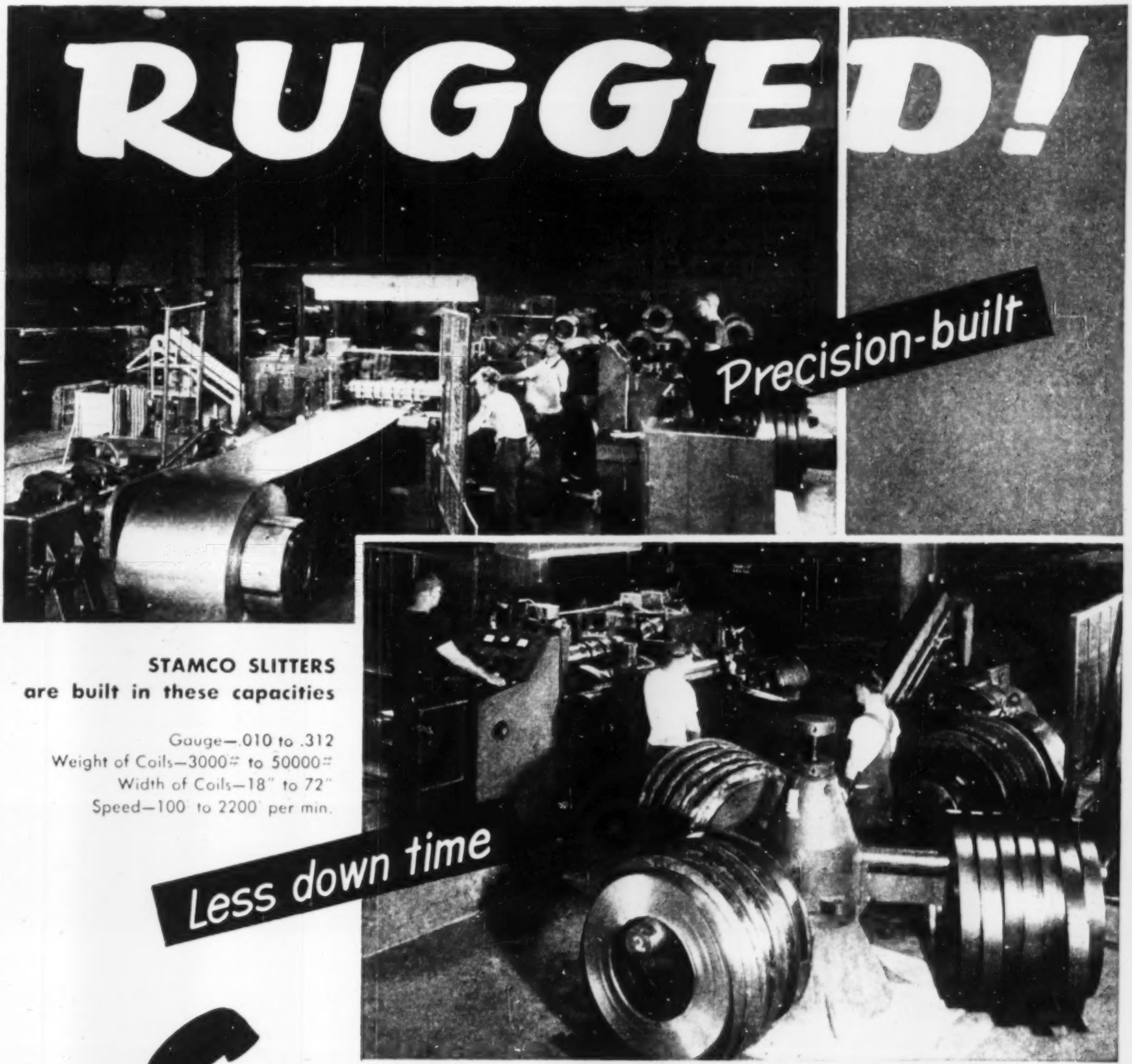
THE PACE IS TERRIFIC: In this large issue the editors have tried conscientiously to reflect as accurately as possible the progress of the metalworking industry as revealed in the past year and as indicated for the future by current developments. Undoubtedly many readers, on the basis of the evidence presented, will agree that the industry's greatest achievement in 1952 was in technological progress. As they go through the infinite detail of this publication's "1953 Forum on Technical Progress" (pp. 205-460), they will acknowledge that the advances in 1952 were unprecedented.

The 210 outstanding specialists who contributed their opinions to the forum present a panorama of accomplishment that is almost breath-taking in its potential for the future. In electronics, automation, atomic energy and less spectacular developments we are going forward technologically at a terrific pace.

* * *

STRIKE RUINS RECORDS: In scanning the wealth of pertinent statistical information in this issue's 48-page "Metalworking Facts and Figures" (pp. 155-202), our eyes hit upon a compilation of steel ingots and castings by countries which shows that 1952 is the first year since World War II in which world steel output fell below that of the previous year. The estimate of 230,458,000 net tons for 1942 is just a shade under the 230,773,148 tons reported in 1951.

This failure to gain was due almost entirely to the American steel strike. It caused output in the United States in 1952 to fall below 1951 and 1950 levels. Belgium and Luxemburg were the only other important steel producing nations to show declines in 1952, and they were moderate. Meanwhile, Russia and her satellites produced about 10 per cent more steel in 1952 than in 1951. It's just too bad that out needless strike spoiled our national record and those of the free world and the entire world as well.



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Gauge—.010 to .312
Weight of Coils—3000# to 50000#
Width of Coils—18" to 72"
Speed—100' to 2200' per min.

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A PROGRAM FOR MANAGEMENT

Now is the time . . .

. . . . for thoughtful metalworking executives to take inventory of their contributions to social, economic and political progress. How will these contributions measure up?

Inland Steel President Clarence B. Randall says industry has "learned how to use every modern tool except language."

Former Mobilization Director Charles E. Wilson charges businessmen have "neglected their social responsibilities."

This is what others say: "Our people perform miraculous feats of production. With steel and copper and aluminum they are the world's greatest builders. They devise fantastic machines to make better goods in greater quantity at lower cost. And as salesmen of those products they are superb.

"But let these men walk out of the plants into the realm of social and political ideas and their daring and confidence desert them. They become timid and inarticulate. Their approach to social questions is likely to be negative. They rarely create concepts that are enthusiastically received by the people. Excellent as they are in selling their product they are only mediocre in selling their social and economic beliefs."

These are, of course, generalizations to which there are brilliant and heartening exceptions. But most businessmen will agree that in the main the criticism is valid.

It explains why in the contest of ideologies over the past two decades businessmen often have come out second best to the professor, the politician and the labor leader. It explains in part why the sound realistic thinking of industrial management has had so little influence in directing our national, social and economic course.

It explains in part why the initiative for social reform was seized by cloudy visionaries and incompetent do-gooders.

It explains in part why we have permitted reckless spending and the accumulation of a public debt of a size that defies comprehension, why we are burdened by tax measures that threaten to strangle incentive, why we have had paternalism in government and why we have veered so far from the course of freedom and enterprise that made this nation the envy of all others.

We nearly lost the battle of ideologies by default.

NOW FOR A FRESH START

The year 1953 brings to business management a new opportunity for leadership. The political climate, cold and damp for twenty years, will become warmer and sunnier. Business now can come out of the political rain. No longer will industry be the favorite whipping boy of the national administration.

The new administration carries a mandate from the people to restore soundness, practicality and incentive to our economy and our society. The heads of that administration will welcome and invite the ideas and help of businessmen to formulate national policies to carry out that mandate.

This is our opportunity to:

Take the initiative and lend our help in charting a correct course for the nation.

Prove to all Americans that our objective is the well-being of all the people and not that of special groups.

Take an understanding approach to economy in government.

Continue to push forward in expanding production, providing employment and prosperity for all the people.

Rekindle incentives for all groups to work and to produce.

Sacrifice as individuals, as companies and as industries our time and energies to those ends.

Will we make the most of this opportunity? On the answer to that rides the hope of our future. If we succeed, this country can go forward to still higher standards of living, toward greater security, toward new opportunities for enterprise and ambition.

If we fail, this new administration may be only a hiatus in the New Deal tide.

ACCENT THE POSITIVE

Businessmen cannot exercise leadership by being against things. We must stand up and fight for that which we believe to be best for all the people.

We dare not wait for proposals for social reform to be made by socialist planners and then attack the flaws in those proposals. We must initiate. The positive statement and proposal is what fires the imagination of the people. It is what makes the front page of the newspaper. The calm and sound analysis pointing out the flaws too likely will be buried on an inside page.

Businessmen cannot be content with griping about unjust taxation and wasteful spending. We must make a realistic study of the needs and suggest how those needs best can be met.

We dare not ignore injustices and maladjustments in the social and economic system until these are pointed out by a rabble-rouser with an easy if ill-conceived panacea. Such injustices and maladjustments must be recognized and corrected as we see them.

BE ARTICULATE

If management is to be effective in lending its direction to the national cause, then management must become more articulate.

We must express our ideas and beliefs freely. We must express them to people in all areas of society, not just to our own groups. We must talk to, and write for, those in the professions, the farmers, the government workers, the educators, labor and all who make up our society.

That is a responsibility that cannot be delegated. If it is to be effective, it must be done by management itself.

The ideas expressed must be those of the individual management man.

When top executives speak before public groups, what they say too often is written by a public relations man. The latter cannot have the insight born of management's experience. Many speeches we all have heard not only have been written by ghost writers but have been further watered down by company lawyers. When that happens the talk neither is delivered with conviction nor received with belief.

DEFINE YOUR PROGRAM

Prime requisite for leadership is a well defined program that will attract interest and enthusiasm. American management has such a program but it not always has been well defined by management itself. Too often the interpreters have been the demagogues, rather than businessmen.

And some elements of the program need attention. Especially is this true where management's views tend toward the negative rather than the positive.

Several score metalworking executives were interviewed by the editors of this publication on what management's program should be. Their thinking, fused and distilled, is:

First, management should continue to improve on its primary job. It should continue to raise productivity and make even more goods for more people, and thus add to its already magnificent contributions toward raising the national living standard. This requires continued and vigorous attention to new production techniques, new equipment, new methods and processes, closer quality control, increased automation. Greater attention should be given to developing better methods of distributing industrial products.

Second, for the future, management should take adequate steps to insure that industry continue at a high level of efficiency. Machinery and equipment replacement programs should be vitalized. New materials must be developed and new uses for them explored. Intensive research programs—basic, product and market—should be carried forward.

Third, industry's relations with other segments of society should be improved. Especially should relationships with government, with the public in general and local communities in particular, and with labor be given the positive treatment.

GOVERNMENT NEEDS YOUR HELP

The new administration which takes over the direction of national policies this month faces a more difficult task than almost anyone realizes. It will inherit the Korean stalemate, a $265 billion debt, a badly devalued dollar, gigantic commitments for military spending and foreign aid, and millions of citizens with a "mother complex" toward the government.

If the administration is to get this country on the course that once led us to prosperity, freedom and greatness, to bring our national finances back to something approaching soundness, and fulfill those commitments we should and must fulfill, then it will need the best talent and genius available.

Industry might give attention to proposing a program to the new Eisenhower administration whereby it offers to lend its promising younger executives to government for a year or more. If government compensation is inadequate, industry might offer to make up the difference. The lending plan could have two major benefits: It would supply able men to government which always has a hard time recruiting competent personnel for its top and middle echelons, and it would provide industrialists with a new insight into the problems of government.

TAKE THE COMMUNITY INTO YOUR CONFIDENCE

Partially as a result of its own relative silence and partially as result of the attacks leveled at it by unfriendly gentlemen in the government, industry does not stand as high in public and community esteem as it deserves. A well planned and vigorously expressed program of public and community relations can help offset this. But before the industry can win acclaim as a good neighbor it must be one.

For example, when U. S. Steel decided to move into peaceful Bucks County in Pennsylvania to build the Fairless Works it anticipated many problems that would arise in the transformation of a rural community to an industrial one. There were serious problems in housing, public utilities, in possible air and water pollution, in the fear that less desirable labor might be imported. The company laid its plans for the new plant carefully. It helped to provide adequate housing, hospitalization and other public facilities. It spent millions to install electrostatic precipitators on its furnaces to prevent air pollution and to build an elaborate water treatment system.

Then top executives of the company went to all kinds of community groups throughout the Delaware River Valley and explained what they were doing and why. The result: Enthusiasm for the new plant throughout the community.

LABOR: THE TOUGH NUT

Probably no problem in recent years has caused management more concern than its relations with unions. Industry-union relations are and have been characterized by turmoil. Big unions, backed to extreme degree by a national administration in its political debt, not only have ridden their demands for economic benefits roughshod over the interests of all the people, but they have in many cases usurped the functions of management. Many managers today believe they cannot operate their plants efficiently for the common good because of the blocks thrown at them by union chieftains.

But the unions are here to stay. The alliance between the union chieftains and the White House is ended. A new era of industry-labor relations can start this year.

If better industrial relations are to be achieved we will have to give this field the same kind of analytical and remedial attention given, with such outstanding success, to the solution of production and sales problems.

Here again the approach must be positive. Too often in the past, management has waited until labor formulated and brought forth its demands, always exaggerated, and then tried to pare them down.

Too seldom has management initiated a program for its workers and sold the workers on it and on where it came from. Yet there are ample opportunities to do so.

For example, every alert management man realizes that one of the coming demands from the unions will be for a guaranteed annual wage. Yet the workers themselves are not particularly interested in a guaranteed wage. What they want is regularity of employment and income. They want to avoid the seasonal unemployment when plants close down for model changeover. Cannot industry itself regularize employment and assure income over the entire year? Is not this a major challenge?

Consider the toy industry. Traditionally it has been a seasonal employer. Its season roughly runs from March to October. Sixty to 70 per cent of all toys are made for the Christmas trade.

For the workers in toy factories this meant several months of unemployment each year. For the manufacturers it meant excessive overtime payments during the busy season, and loss of skilled workers to other industries during the slack season.

Toy manufacturers undertook to regularize production and employment over the entire year. They promoted toy sales throughout the year. They placed emphasis on toys for seasons other than Christmas — toy cannons for the Fourth of July, log cabins for Lincoln's Birthday. They encouraged greater storage of toys at warehouses of the manufacturers, encouraged wholesalers to accept earlier deliveries, and retailers to take earlier deliveries from distributors. Commendable progress has been made.

A positive approach to regularizing production and employment offers interesting possibilities for other industries. It is not an easy job, nor one that can be done quickly. Neither is it impossible. The potential benefits to workers and to industry are substantial.

TIME FOR ECONOMIC STATESMANSHIP

You may interpret the November elections as a mandate to reverse the socialistic trend of twenty years, to replace a handout economy with one that encourages incentive and rewards ambition and productivity. But the new administration alone cannot accomplish those ends. It will take all the courage, all the work and all the devotion of all the people who believe in freedom and enterprise to re-establish the principles that have made this country so great.

There are still many who place their faith in omnipotent government, in big unionism, in false security and in a planner's economy. They also will work for their cause with devotion.

The decision made in November, 1952, was only a start. The big decisions that will determine whether this country and its industry will continue to grow in greatness are yet to be made. Now we have the opportunity to show what industry can contribute. We need a program for what we want this nation to be. We need to explain that program articulately. We need to implement that program with positive action. We need to start now because if we hesitate, we may lose our chance forever.

Now is the time!

A SPECIAL REPORT

What Metalworking Management Expects in 1953 . . .

- Metalworking production will continue to rise in 1953.
- Employment will be greater.
- Manufacturing capacity will expand.
- Materials shortages will ease.
- Defense will take about the same proportion of output.
- More attention will be given research—product and market.
- Unit costs, selling prices and sales costs will edge upward.
- Productivity will gain slightly.

The editors of this publication long have believed that the best indicator of the trend of business in metalworking is what executives of metalworking companies themselves believe is ahead. Experience has shown this to be true.

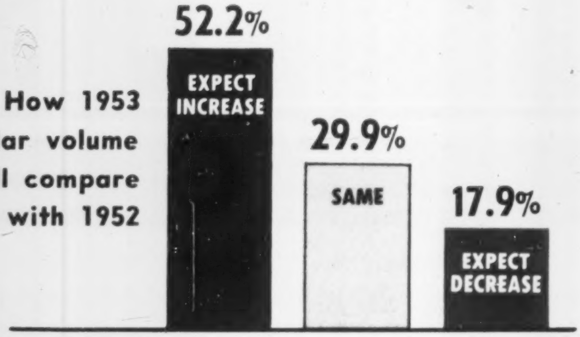
In late 1945, professional prognosticators were predicting a serious postwar recession, with falling production and increasing unemployment. But answers to a questionnaire from this magazine directed to a substantial cross-section of the heads of metalworking companies indicated a postwar boom. The boom, and not the recession, developed.

Again in late 1946, government economists were worrying that the upturn could not last. Again the metalworking industry said we would reach new heights in 1947. We did.

After the November elections, STEEL directed a new questionnaire to its readers. The consensus of 1152 top executives who responded is contained in the following pages.

PRODUCTION VOLUME

How 1953 dollar volume will compare with 1952



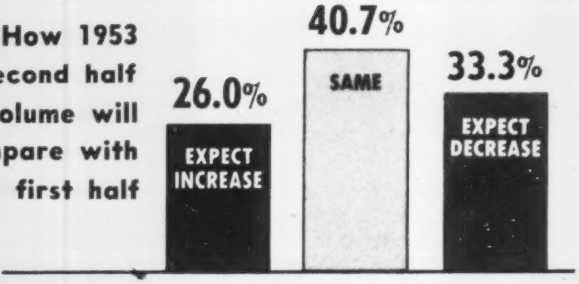
OF THOSE EXPECTING INCREASE

5.0% expect it will be less than 5%
34.2% expect it will be 5–10%
30.2% expect it will be 10–15%
19.2% expect it will be 15–20%
11.4% expect it will be more than 20%

OF THOSE EXPECTING DECREASE

8.8% expect it will be less than 5%
35.0% expect it will be 5–10%
31.4% expect it will be 10–15%
17.5% expect it will be 15–20%
7.3% expect it will be more than 20%

How 1953 second half volume will compare with first half



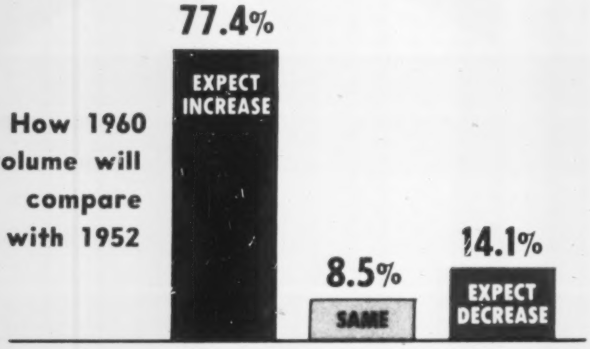
OF THOSE EXPECTING INCREASE

11.2% expect it will be less than 5%
35.5% expect it will be 5–10%
16.8% expect it will be 10–15%
15.7% expect it will be 15–20%
20.8% expect it will be more than 20%

OF THOSE EXPECTING DECREASE

17.7% expect it will be less than 5%
37.6% expect it will be 5–10%
23.6% expect it will be 10–15%
11.0% expect it will be 15–20%
10.1% expect it will be more than 20%

How 1960 volume will compare with 1952



OF THOSE EXPECTING INCREASE

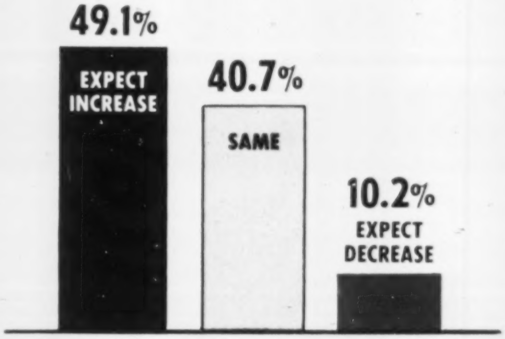
12.4% expect it will be less than 10%
59.9% expect it will be 10–25%
19.0% expect it will be 25–50%
8.7% expect it will be more than 50%

OF THOSE EXPECTING DECREASE

22.5% expect it will be less than 10%
59.2% expect it will be 10–25%
18.3% expect it will be 25–50%
0% expect it will be more than 50%

EMPLOYMENT

Will you have more employees in 1953 than in 1952?



OF THOSE EXPECTING INCREASE

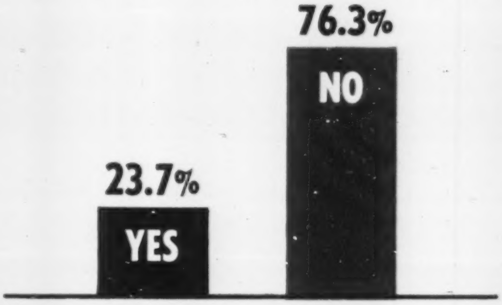
23.1% expect it will be less than 5%
40.2% expect it will be 5—10%
20.2% expect it will be 10—15%
11.0% expect it will be 15—20%
5.5% expect it will be more than 20%

OF THOSE EXPECTING DECREASE

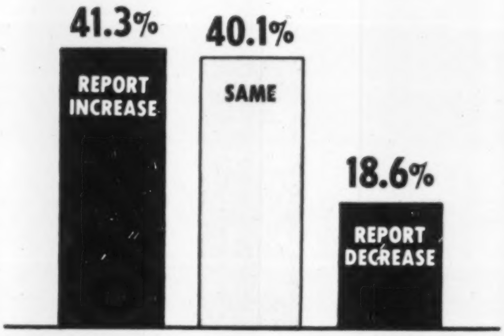
24.6% expect it will be less than 5%
28.6% expect it will be 5—10%
28.6% expect it will be 10—15%
14.3% expect it will be 15—20%
3.9% expect it will be more than 20%

- Recruiting and maintaining a full complement of competent workers will continue to be a major problem in 1953. Half the reporting companies expect to increase employment; only 10 per cent expect to have fewer workers on payrolls. With the possibility of stepped up military operations, manpower shortages will become more important than material scarcities. One of four metalworking employers expects a shortage of skilled workers will curtail 1953 production. Bright spot: Productivity per worker will be somewhat higher.

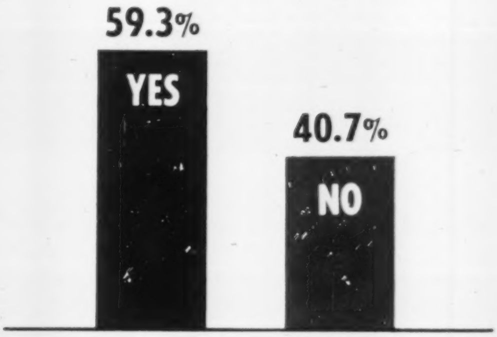
Will your 1953 output be curtailed by a shortage of workers?



Did productivity of workers increase or decrease in 1952?

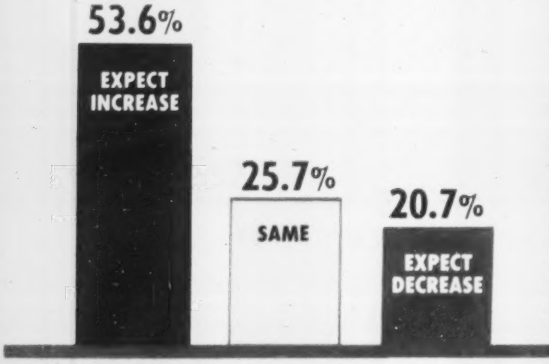


Do you expect worker productivity to increase in 1953?



MANUFACTURING COST

How 1953 unit cost of manufacturing will compare with 1952



OF THOSE EXPECTING INCREASE

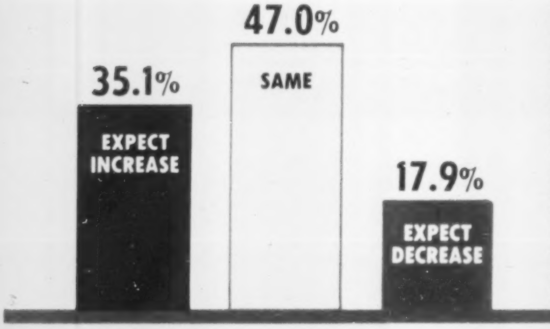
32.7% expect it will be less than 5%
53.2% expect it will be 5–10%
13.1% expect it will be 10–15%
.7% expect it will be 15–20%
.3% expect it will be more than 20%

OF THOSE EXPECTING DECREASE

38.7% expect it will be less than 5%
47.1% expect it will be 5–10%
10.3% expect it will be 10–15%
2.6% expect it will be 15–20%
1.3% expect it will be more than 20%

SELLING PRICES

How 1953 selling prices will compare with 1952



OF THOSE EXPECTING INCREASE

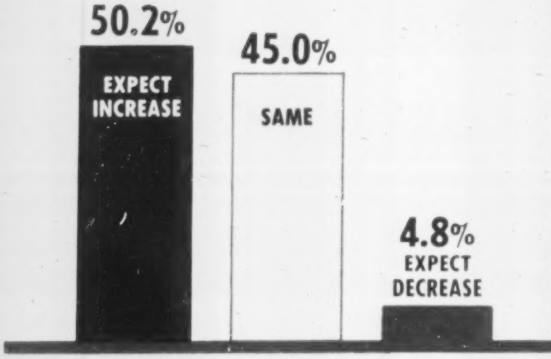
44.8% expect they will be less than 5%
46.3% expect they will be 5–10%
8.2% expect they will be 10–15%
0% expect they will be 15–20%
.7% expect they will be more than 20%

OF THOSE EXPECTING DECREASE

44.7% expect they will be less than 5%
43.0% expect they will be 5–10%
10.5% expect they will be 10–15%
1.8% expect they will be 15–20%
0% expect they will be more than 20%

SALES & DISTRIBUTION COSTS

How 1953 sales and distribution costs will compare with 1952



OF THOSE EXPECTING INCREASE

41.9% expect they will be less than 5%
41.5% expect they will be 5–10%
12.2% expect they will be 10–15%
3.3% expect they will be 15–20%
1.1% expect they will be more than 20%

OF THOSE EXPECTING DECREASE

37.9% expect they will be less than 5%
37.9% expect they will be 5–10%
6.9% expect they will be 10–15%
10.4% expect they will be 15–20%
6.9% expect they will be more than 20%

CONTROLS

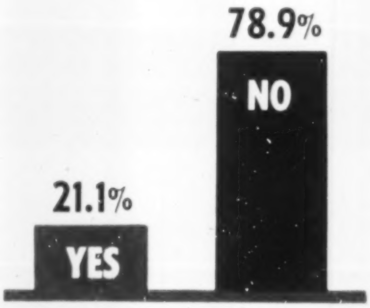
- Metalworking management believes we now can abandon controls over prices and over most materials. There is no strong sentiment for a permanent standby control system against future emergencies.

Many materials which were in short supply during 1952 are expected to be more plentiful this year. Only one out of five metalworking executives expects material shortages will curtail production. Nickel, copper, aluminum, and some forms and certain analyses of steel will continue troublesome.

Seven out of ten companies report they now are selling some of their products below Office of Price Stabilization ceilings.

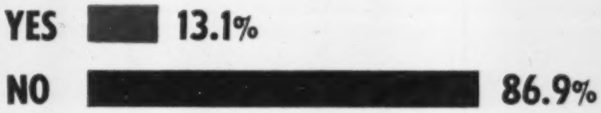
Few are seeking price relief under OPS earnings standards.

Do you expect materials shortages to curtail 1953 production?

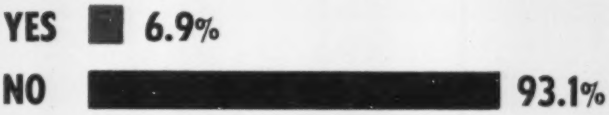


Materials most frequently in critically short supply: Nickel, copper, aluminum and steel.

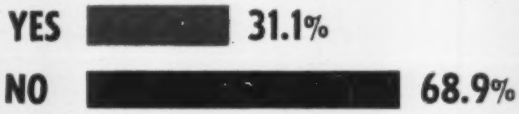
Should controls over materials be continued in 1953?



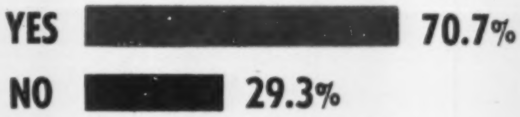
Should controls over prices be continued in 1953?



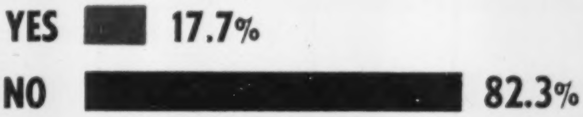
Should a price and material control organization be retained on a permanent standby basis?



Are you selling any of your products below OPS ceilings?

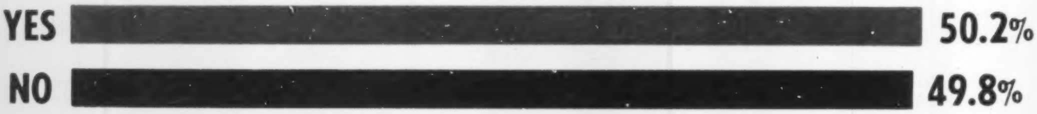


Have you or are you planning to apply for price relief under OPS earnings standards?



PLANT and EQUIPMENT

Do you plan to begin any new manufacturing capacity in 1953?



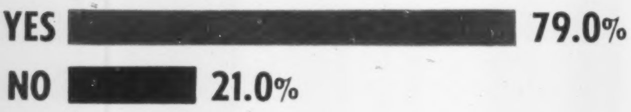
OF THOSE PLANNING TO INCREASE MANUFACTURING CAPACITY

44.2% expect it will be less than 10%
43.9% expect it will be 10–25%
9.3% expect it will be 25–50%
2.6% expect it will be more than 50%

22.3% will build new plants
46.3% will build additions to present plants
87.4% will install new equipment

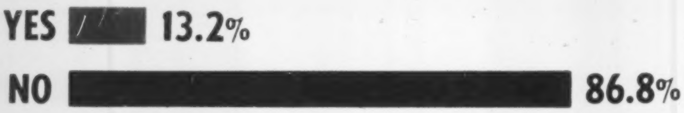
DEPRECIATION

Do you think tax laws should be revised to permit faster amortization as a permanent policy?



Most respondents favor optional amortization periods or fixed periods of 10 years or less

Do you have a regular plan for replacing obsolete equipment, such as the MAPI formula?

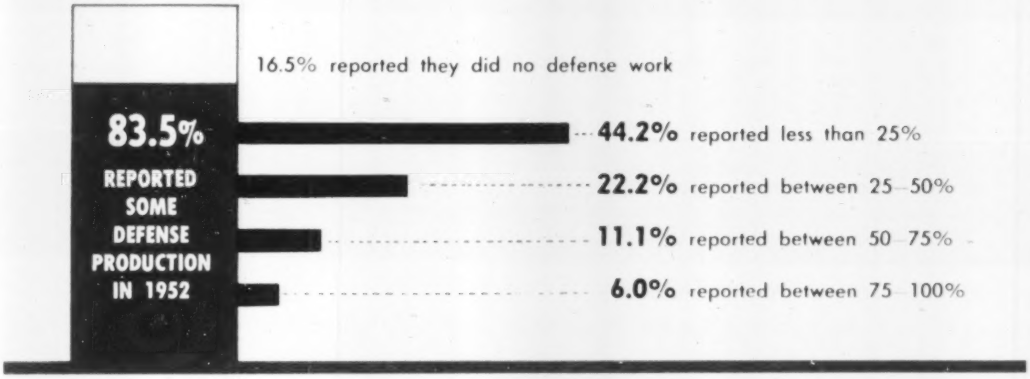


● Four out of five metalworking men believe tax laws and regulations should be revised to permit fast amortization as a permanent policy. Generally they believe amortization periods for machinery and equipment should be shorter than those now provided. Many favor amortization periods at the buyer's option.

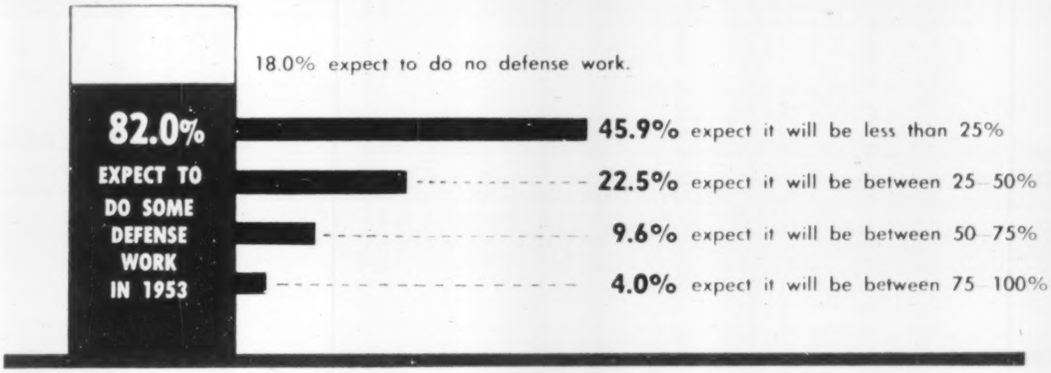
Half the companies questioned will begin new manufacturing capacity in 1953. One in five of those planning expansions will build new plants, nearly half will build additions to present plants and nine of ten will install new equipment and machinery.

DEFENSE PRODUCTION

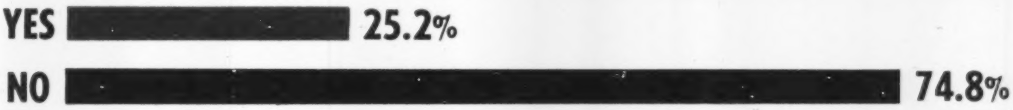
What percentage of your production was for defense in 1952?



What percentage of your 1953 production do you expect will be for defense?



Do you have a formal post-defense planning program?



How do you expect to compensate for loss of defense business in post-defense period?

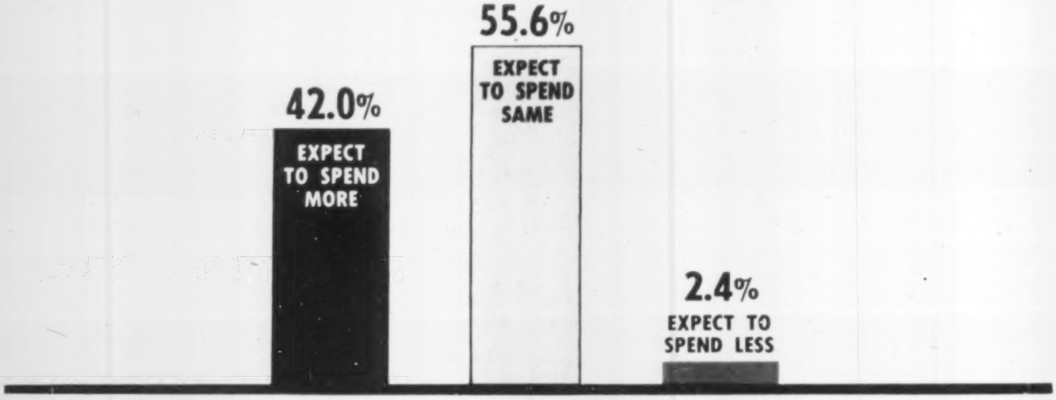
40.3% WILL SEEK LARGER SHARE OF NORMAL MARKET

22.8% WILL INTRODUCE NEW PRODUCTS

36.9% WILL DO BOTH

PRODUCT RESEARCH

Will 1953 product research and development expenditures be more than in 1952?



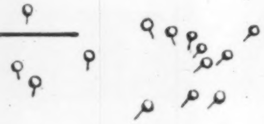
OF THOSE PLANNING TO SPEND MORE

13.5% expect it will be less than 5%
40.2% expect it will be 5–10%
25.0% expect it will be 10–15%
16.9% expect it will be 15–20%
4.4% expect it will be more than 20%

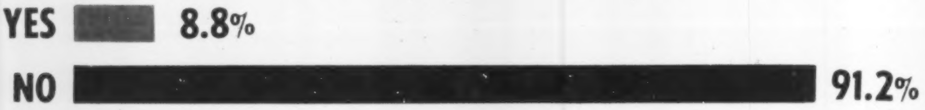
OF THOSE PLANNING TO SPEND LESS

33.3% expect it will be less than 5%
25.0% expect it will be 5–10%
25.0% expect it will be 10–15%
16.7% expect it will be 15–20%
0.0% expect it will be more than 20%

MARKET RESEARCH



Do you have a formal market research department?



4.0% of those reporting plan to start one in 1953

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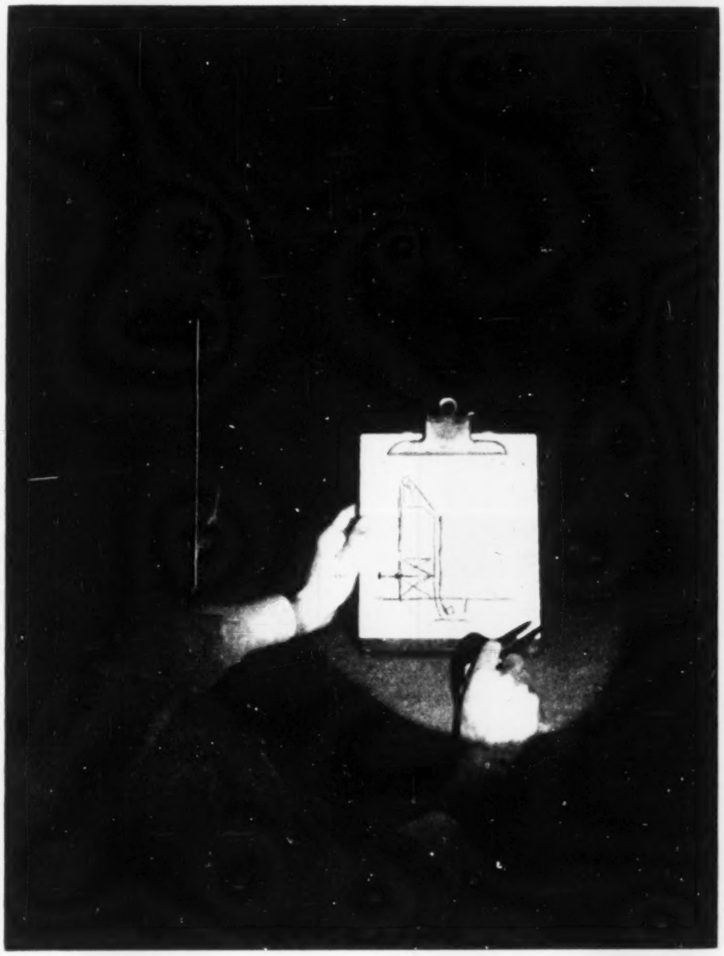

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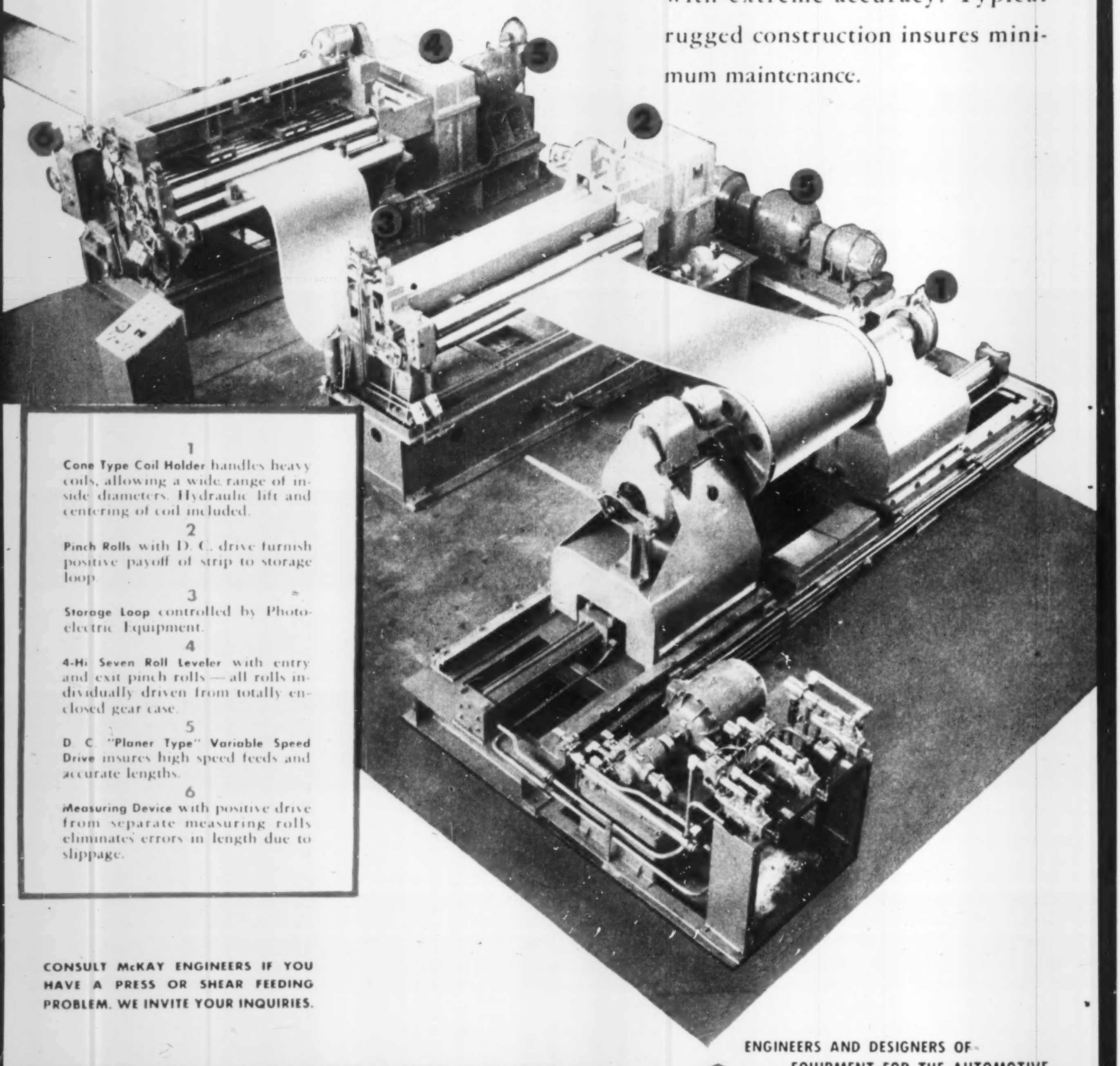

1
Cone Type Coil Holder handles heavy coils, allowing a wide range of inside diameters. Hydraulic lift and centering of coil included.

2
Pinch Rolls with D. C. drive furnish positive payoff of strip to storage loop.

3
Storage Loop controlled by Photoelectric Equipment.

4
4-Hi Seven Roll Leveler with entry and exit pinch rolls — all rolls individually driven from totally enclosed gear case.

5
D. C. "Planer Type" Variable Speed Drive insures high speed feeds and accurate lengths.

6
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WINDOWS OF WASHINGTON

By E. C. KREUTZBERG *Washington Editor*

It's Up To You

The New Business-Government Accord Can Thrive If Industry Makes It Work

A TRIFLE to the right of center. That describes the direction in which the federal government is headed for the next four years.

It certainly is true of Congress which in recent years increasingly rejected Mr. Truman's Fair Deal programs and which, in the light of the election results, can be expected to take an even stronger position in perpetuating the American system. It certainly is true of the incoming administration which explicitly has stated that it has no "reform" program other than to clean up "the mess" in Washington.

Objectives—The major aims of President-Elect Eisenhower are to eliminate corruption in the government, create a positive foreign policy, improve operational efficiency of the cumbersome executive branch, reduce federal expenditures, balance the budget, lower taxes, stop the trend toward bigger and bigger government and provide a more favorable climate in which our traditional economic system can operate and prosper.

General Eisenhower estimates that it will take over two years before any major progress toward these objectives becomes apparent. Having surrounded himself, to a greater extent than any past President, with business executives of commanding stature and proven competence, his administration promises welcome changes from those of the recent past, insofar as business is concerned.

The Questions—As we go into

PRESIDENT-ELECT EISENHOWER

. . . business men have his ear

ASSISTANT-TO-PRESIDENT SHERMAN ADAMS

. . . he'll shoulder administrative burdens

the New Year, big questions are:

What about military activities and foreign assistance? Where will we reduce government spending? How much, if at all, can we reduce federal taxes? Have we further need for controls over wages, prices and materials? What changes in the tax system would help business? What should we do about our present labor law? What must we do to increase foreign trade? Have we reached the point where we can legislate a permanent farm price program?

Too Early—Until the new President decides and makes known what his foreign policy will be, it's difficult to know what can be done about the federal budget. But politicians' predictions that the budget can be balanced and taxes reduced soon is eye-wash. The chance of quick and substantial tax relief is small. Take the year in which we have reached the midpoint fiscal 1953. The budget request was $85.4 billion, expenditures are running to between $75 and $80 billion, and we will come to June 30 with a deficit of between $8 and $13 billion. Recently leading Republican congressmen have estimated that fiscal 1953 appropriations will be held to $70 billion, but they have made no allowance for possible increased costs under the foreign program still to be laid down by Eisenhower. It's too early yet to promise any tax relief.

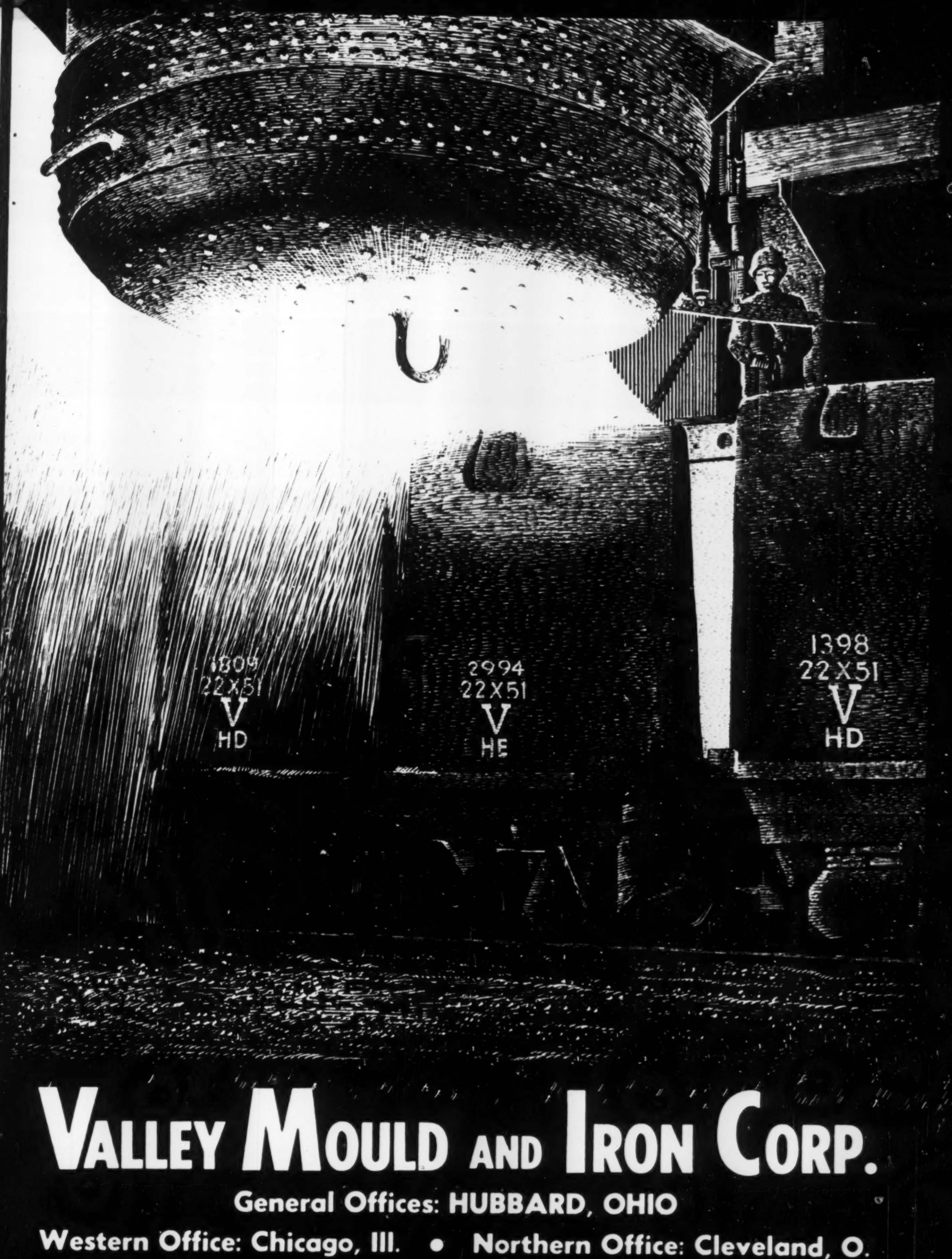
And for the same reason, it is too early yet to know the actions that Congress will take with regard to wage and price and materials controls; should Eisenhower sell Congress on the need for a big increase in military production the whole outlook might change. Yet odds are that wage and price controls will be dropped next Apr. 30 and that controls on materials will be eased markedly by next June 30.

Different Story — As to government non-military spending, a lot is to be done; the wheels already are in motion. Co-ordinator of this program is Sherman Adams, the incoming assistant to the President. Assisting him is a citizens' advisory committee headed by Nelson A. Rockefeller. This group is discussing the approach to be made on the problem. It is considering se-

LEGISLATIVE ASSISTANT
W. B. PERSONS
. . . experienced in liaison

ADMINISTRATIVE ASSISTANT GABRIEL HAUGE
. . . trouble-shooter

APPOINTMENTS SECRETARY
A. H. VANDENBERG
. . . son of the late senator


1809
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DEFENSE SECRETARY C. E. WILSON
. . . . *production expert from GM*

TREASURY SECRETARY G. M. HUMPHREY
. . . *steel and coal magnate*

riously recommending the creation of another group along the lines of the Hoover commission whose findings resulted in so many improvements in government organization and efficiency. This would be a long-range job; in the meantime quick action would be sought through the administrators who will take office Jan. 20. As an example, Harold Stassen, incoming Mutual Security director, already is analyzing reports that we have just about twice the number of administrators and employees in our foreign posts as efficient operation requires.

Present plans call for the use of more commissions in the future to determine the best solutions of legislative problems. The incoming Vice President, Richard Nixon, tentatively is slated to run this particular show.

More Study—In addition to a possible new commission on government reorganization, there is definite talk about setting up commissions: To draw up a permanent farm price policy; to build up a tax system free of defects which now hamper business and industrial expansion; to find an answer to the $64 question as to how to make foreign trade take the place of foreign aid; to determine which present federal agencies and activities should be turned over to states and municipalities; to learn whether it will be better for the nation to have such activities as those of the Post Office run by private industry rather than by the government, to study whether the government should turn the TVA and other government properties over to private firms.

Many businessmen have criticized Mr. Eisenhower's selection of Martin P. Durkin as his labor cabinet member but in Washington this selection is applauded. The labor leaders are here, in control of millions of workers in their unions —and the general learned in the Army that you have to get along with the people you have to get along with. Acting on a variation of the old slogan "if you can't lick 'em jine 'em," he took a man from the ranks of the labor leaders who have been demanding repeal of the Taft-Hartley Act and who want their powers secured through elimination of the bans on the closed shop and secondary boycott. The new President is reported to have told the labor leaders substantially that he would go along with them on T-H law amendment as long as they afford protection to the public and as long as they insure fair treatment to management as well as the unions. On that basis, it is understood, the AFL (by far the biggest outfit as to membership) furnished Durkin.

The Conservative Side—Selection of an AFL man for the labor portfolio has a connotation of significance to industry. The AFL represents the conservative element in the American labor movement. It never has approved the concept that wages can be increased out of profits without increasing prices. It strongly approves of the free enterprise system.

Unless Senator Taft's resentment over the Durkin appointment is more deep-seated than seems likely, no great difficulty should be encountered in getting an acceptable termination of the long Taft-Hartley squabble. Specifically, neither Messrs. Taft or Eisenhower desire any drastic amendments to the T-H law. Neither at the present time would support an amend-

INTERIOR SECRETARY
DOUGLAS MC KAY
. . . *Oregon governor*

LABOR SECRETARY
MARTIN P. DURKIN
. . . *AFL union official*

COMMERCE SECRETARY
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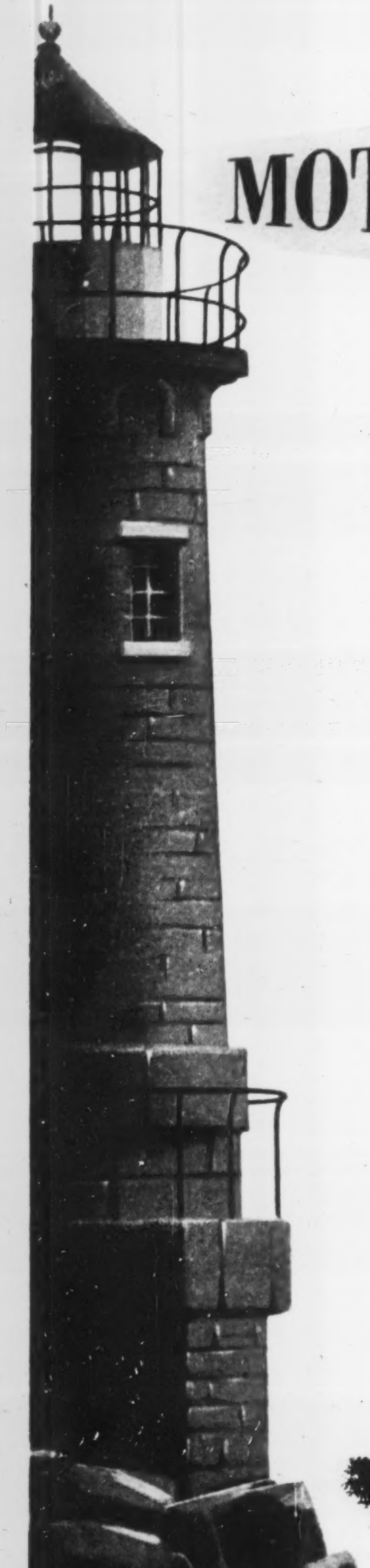

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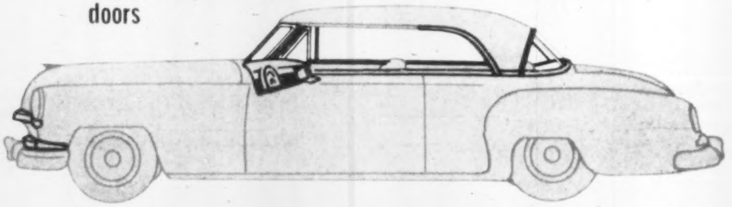

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Congress Worksheet for 1953

TAX SUSPENSION:	A copper import tax imposed by the Internal Revenue Code returns to effect if power to suspend it lapses	Feb. 15, 1953
DUTY-FREE ZINC:	Authority to waive the duty on imports of zinc in ores, blocks, pigs and slabs is valid until	Mar. 31, 1953
DUTY-FREE LEAD:	Authority to waive the duty on imports of lead in ores, flue dust, mattes, reclaimed lead, scrap lead, antimonial lead and antimonial lead scrap is valid until	Mar. 31, 1953
EXECUTIVE REOGANIZATION:	The Reorganization Act of 1949, authorizing the President to reorganize the executive branch, expires	Apr. 1, 1953
EMERGENCY POWERS:	The Emergency Powers Continuation Act authorizes the Navy to acquire and operate facilities; enables TVA to sell for export low-grade ferrophosphate not usable economically by U. S. steel producers but used in Belgian and Luxembourg steelmaking process; authorizes secretaries of War and Navy to provide installation for the manufacture of military equipment, and to operate and dispose of plants; provides up-to-death penalty for disclosing defense information, committing sabotage, manufacturing defective war material and spreading false reports; provides against excessive royalty payments for use of inventions in the defense program. All those powers expire	Apr. 1, 1953
DEFENSE AUTHORITY:	Defense Production Act powers for wage, price and rent controls and for calling tripartite conferences for considering labor dispute cases runs out	Apr. 30, 1953
TRADE AGREEMENTS:	The President's right to enter into foreign trade agreements under Section 350 of the Tariff Act runs out	June 12, 1953
FOREIGN AID:	The Mutual Security Act expires	June 30, 1953
EXPORT CURBS:	The Export Control Act runs out	June 30, 1953
CONTRACTORS' PAYMENTS:	Under Title II, First War Powers Act, the President may enter into and modify contracts and make advance and progress payment to contractors until	June 30, 1953
DEFENSE POWERS:	Authority of the President under Defense Production Act to control materials, requisition and condemn, make loans, purchase materials and equipment and in other ways to encourage defense production; to regulate real estate construction credit; to encourage prefabricated housing construction through loans; and authorize existence of Small Defense Plants Administration expires	June 30, 1953
METAL SCRAP Except Lead	Duties and import taxes on metal scrap other than lead return to effect unless power to suspend lapses	June 30, 1953
EXCESS PROFITS:	The law expires	June 30, 1953
CAPITAL GAINS TAX:	Long-term capital gains tax for individuals, trusts and estates drops from 26 to the old rate of 25 per cent The reduction will apply to corporations	Nov. 1, 1953 Mar. 31, 1954
RENEGOTIATION:	Authority under Section 212 of the Renegotiation Act to renegotiate performance under defense contracts made after Dec 31, 1953 expires	Dec. 31, 1953
SURTAX:	Increased surtax rates on individuals imposed by P.L. 183, 82nd Congress, end and old rates are restored unless Congress acts by	Dec. 31, 1953
INVENTORY:	Authority to corporations and individuals to make adjustments for income tax purposes of the increased cost of goods bought to replace inventory depleted involuntarily because of defense activities and controls expires	Dec. 31, 1953
PAYROLL TAX:	The 1.5 per cent payroll tax paid by employers and employees is to rise to 2 per cent, and the 2.25 per cent rate on incomes from self-employment is to rise to 3 per cent unless Congress decrees other arrangements before	Jan. 1, 1954
CORPORATE TAXES:	The normal tax on corporations drops back from 30 to 25 per cent unless Congress votes otherwise before	Mar. 31, 1954
EXCISE TAXES:	Increased excise tax rates in P. L. 183, 82nd Congress, drop to old rates unless Congress rules otherwise by Mar. 31, 1954	

WINDOWS OF WASHINGTON

(Concluded from p. 128)

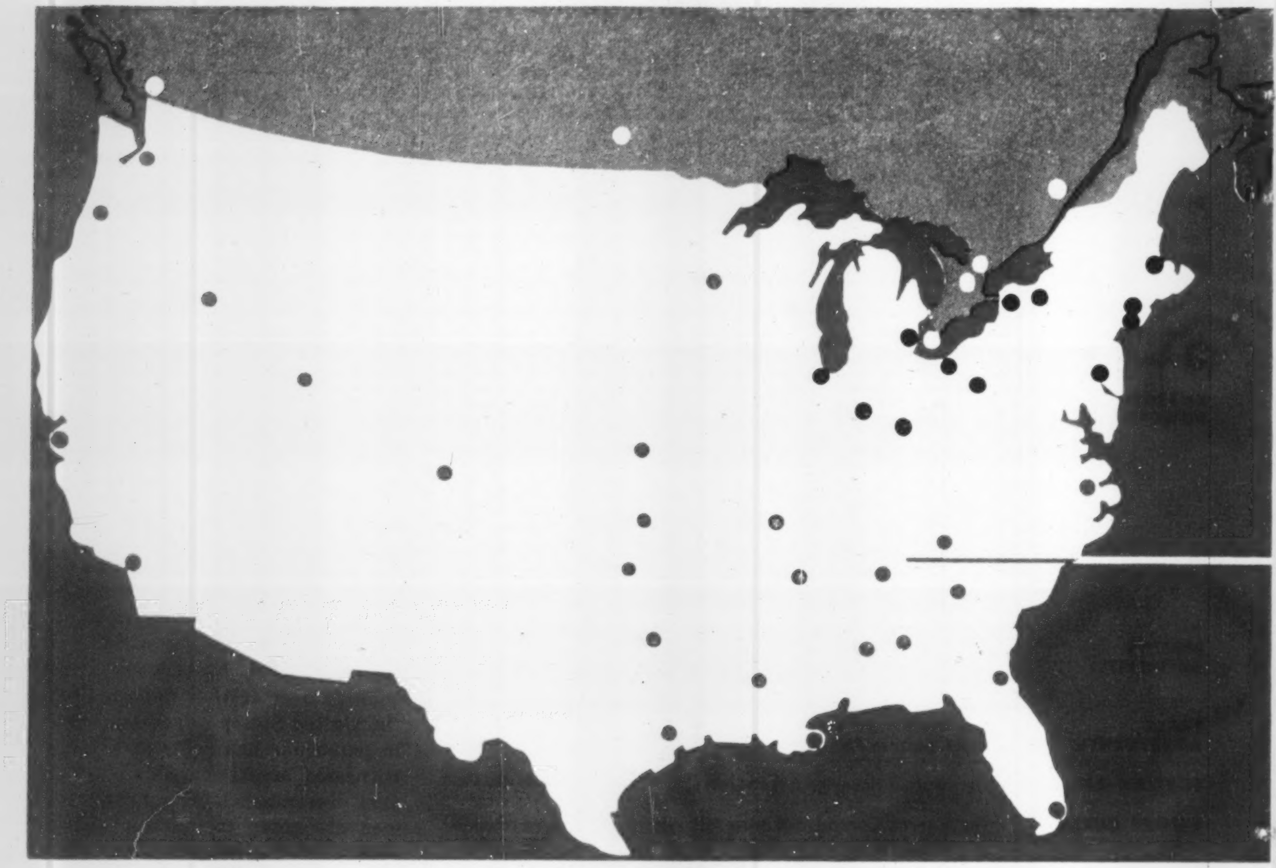
ment banning union-wide bargaining in an industry; this would come under the head of "union-busting." The Senator has gone so far as to say he wants no law that would give the government power to settle strikes. Labor disputes, he said, have a habit of somehow getting settled. There might be an occasional bad strike requiring government intervention; in such a case Congress could pass a special law applying to that strike only.

Fireworks — Opposing business views about tariff protection will provide fireworks at the committee hearings when the Reciprocal Trade Agreements Act comes up for extension. Several countries, in retaliation over the barriers we have placed in the way of some of their products, have lowered the ceilings over certain imports from the United States. American flour in particular has suffered. Unless witnesses submit fair and intelligent recommendations, congressmen are going to get the impression that the average American manufacturer believes in free trade — just so his own product is adequately protected.

Strangely enough, despite the penetrating studies of the Machinery & Allied Products Institute and other groups, there is no unanimity among businessmen about the need for a permanent fast amortization policy. Some businessmen say they get along all right under the present system. They buy machinery for a certain job and sell when they finish with it, and they are satisfied with the present write-off system. Conflicting stories on this and other tax matters will serve to confuse congressmen.

The Big Moment—American businessmen have a great opportunity to make their opinions felt in Washington from now on. Their judgment will be honored as it hasn't been for 20 years in the nation's capital. For example, it will actually be sought by the House Ways & Means and Senate Finance committees when those bodies start hearings on the next revenue bill.

Industry's views will carry more weight if there's more unanimity of opinion than now exists.



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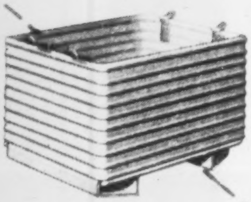

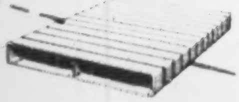

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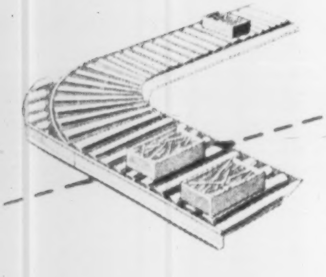

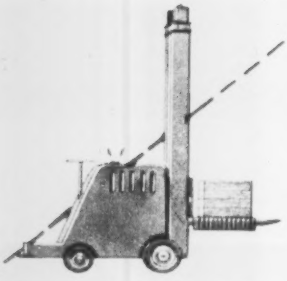

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NATIONAL STEEL CORPORATION

By H. C. TUTTLE *Detroit Editor*

THE DEALER'S SHOWROOM: As competition gets keener, automobile dealers will carry their fight for the new-car markets to the showrooms of nation

THE AUTO INDUSTRY Fights for Markets

SELLING this year will take over from manufacturing as the most important activity of the auto industry.

For brief periods during the last 11 years the buyer was in the driver's seat determining auto sales and production, but in 1953 he will probably be in control most of the year. True, output ceilings imposed by the government are still in effect, but they will be assuming progressively less importance throughout the coming months.

The Catch—Yet, as long as controls last there can be no completely competitive market. The industry is still straitjacketed at several points. It's limited as to the total number of units it can build; its individual companies are restricted to a fixed percentage of that total; its materials allocations are insufficient for the permissible outputs and are not balanced between copper, aluminum and steel for the same production. It also has to abide by price and wage regulations. Controls have tried to solidify the industry in some close approximation of a competitive situation, but static competition is an impossibility. Their lifting, however, will be the checkered flag which will start every company off on the race for the public's favor.

In preparing for the race many of the passenger car makers have thrown away their past record books. For that reason you find companies like Packard, whose president has set a 1953 sales goal of almost double 1952's; Lincoln-Mercury Division, whose general sales manager believes the public

NEW ENGINEERING FACILITIES: "We should all be concerned about the future; we will have to spend the rest of our lives there." C. F. Kettering

Research Laboratories Division's buildings rise at General Motors Technical Center north of Detroit's city limits

Forty-five miles of testing track are being built at Chrysler's 3800-acre proving grounds at Chelsea, Mich.

First unit built in the $50-million Ford Dearborn Research & Engineering Center is the Dynomometer building

NEW BODY MATERIAL: Plastics move a step closer to greater use as the sports car trend catches on in the United States. This 185-pound glass fiber-polyester resin body is in commercial production in California (STEEL, Oct. 6, 1952, p. 61)

will want 75 per cent more Lincolns than it bought in 1952; and Buick, Willys, Dodge, Hudson and others setting for themselves higher shares of the total market.

The How of It—The question immediately rises "How do they propose to do it?" The over-simplified answer is "salesmanship." Every company has improved its 1953 product to give its dealers a more saleable item. A case in point is Buick whose cars will go on display in a week or so. Buick customarily concentrates its big model-year changes in one or at most two of its series. This year, however, all three can boast changes which provide better performance.

And not to be overlooked are the attempts of many makers to spread their wares over a larger part of the market. Packard has this in mind by splitting its line into two series a move which will be emphasized even more in coming years as the Clipper and Packard series take on different appearances. Hudson will do it by introducing its "Jet" in the popular-price class. Both of these companies are adding materially to their number of dealer outlets. The Buick, Cadillac and Packard sports-type cars and the forthcoming plastic-bodied Henry J and Willys and Nash NXI are other indications of reaching for new markets.

Sales Techniques—A stepped-up advertising program of many makers is part of this sales process. The most vital link in the manufacturer-to-buyer chain, however, is the dealer, and he is getting the largest dose of sales training he has had since before the war.

There may be tricks to the car selling trade but they, in the view of most factory sales managers, are of far less importance than the relearning of basic sales fundamentals. One company is sending personal emissaries of its president into the dealerships to make sure prospect lists are kept, telephone offers of personal demonstrations are made, salesmen sell and not make excuses, and sales training programs are conducted.

Big Year—From every indication 1953 is to be a very active year for the car and truck makers. It begins with a first quarter permissible production of 1,250,000 cars and 315,000 trucks. Second quarter output limits have been set at 1.5 million cars and 315,000 trucks but only enough metal has been allotted to build 1,250,000 cars. The first quarter's ceiling is 24 per cent higher than 1952's was. Truck quota is up 16 per cent. Some specific car makers, however, are scheduling much greater production goals than that increase. Buick is shooting for 50 per cent over its first quarter, 1952, output.

As at the beginning of any year there is no unanimity in estimates to the size of the waiting market. Under last year's restricted output conditions the U. S. motor vehicle industry turned out approximately 4,332,000 cars and 1,222,090 trucks and buses for an estimated total of 5,554,000 units. That compared with 1951 production of 5,336,935 cars and 1,428,328 trucks and buses, totaling 6,765,263 units. Guesstimates of 1953's production center around 5 million cars and 1.2 million trucks.

More Optimistic — Individual members of the industry have more optimistic ideas than this. Buick's general manager, Ivan Wiles, for one, believes that 5.3 million passenger cars can be made and sold this year, and the Crowell-Collier survey indicates there will be prospects for 5,496,000 cars. A probable combined car and truck output in the neighborhood of 6.2-6.5 million is better than some conservatives believe future years will sustain. Some economists feel that 4,750,000 to 6,000,000 units is about the best that can be hoped for in each year over the next ten. No less a forecasting expert than C. E. Wilson, however, has doped out that the car and truck population of the U. S. will have increased from 53,363,000 in 1952 to 80 million in 25 years. Registrations went up 4,168,000 from the end of 1950 to the end of 1952. Some analyzers of car registration figures believe that the replacement market alone will account for 3.5 to 4 million vehicles annually.

In the seven years since the war ended 31,088,411 cars and 8,606,289 trucks and buses have been built in U. S. plants. These have helped bring the average age of all cars in use closer to the 1941 figure when of 29.5 million registered only 20 per cent were nine years old or older. However, approximately twice that percentage of our cars still are of prewar vintage. Furthermore, the distance they are traveling each year is on

(Please turn to p. 139)

HAMILTON BEACH
HAMILTON BEACH

THIS NEW HOME DRINK MIXER BY HAMILTON BEACH

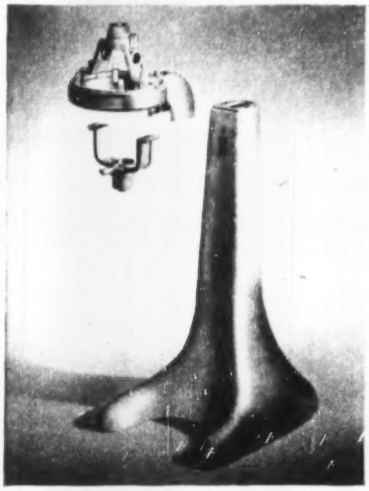
SHOWS HOW TO

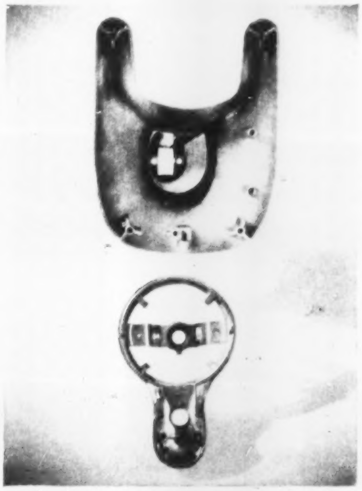
get the mo$t for your Zinc Die Ca$ting Dollar

Hamilton Beach market experts established that a low cost mixer which would make real soda fountain drinks at home would have immediate acceptance. But it remained for the design engineers to produce a unit that would work just like a fountain mixer, yet would be priced for mass distribution. This design goal was achieved, in large measure, through the use of the three ZINC Die Castings pictured below—the base, the combined motor housing collar and upper bracket, and lower bracket.

By any means other than die casting, these components would involve expensive machining, or they would have to be built up from several additional parts. As ZINC Die Castings, the only operations required prior to assembly are simple broaching and tapping. Two of the castings are shown from the underside (below) to reveal other economies. Note that they are cast hollow in thin section to minimize metal, and all assembly holes and bosses are provided in the casting operation.

It is the unusual castability of the ZINC Alloys—in high speed plunger-type machines with long die life—that accounts for the preference for this metal by die casting engineers. In selecting a die casting alloy there are many factors other than base price of the metal to be considered. Ask any commercial die caster about the economic and physical advantages of ZINC Die Castings. Ask us for a copy of a pamphlet which will reassure you on the present and future supply of zinc.





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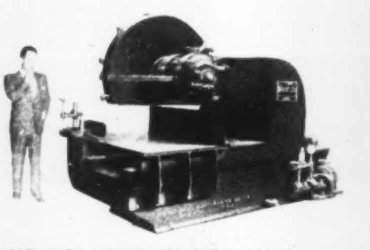

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. . . enable you to do the job faster

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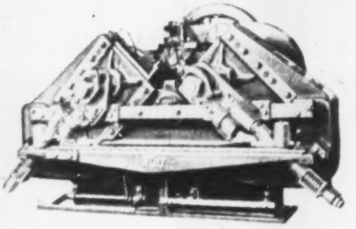

KLING DOUBLE ANGLE SHEARS

. . . 2 Shears in 1 machine

This high-production machine can give you more and cleaner cuts on many different shearing operations. For instance you can simultaneously shear round bars and bar angles on left side and structural angles and flat bars on the right. Automatic hold-downs as well as automatic lubrication are available.

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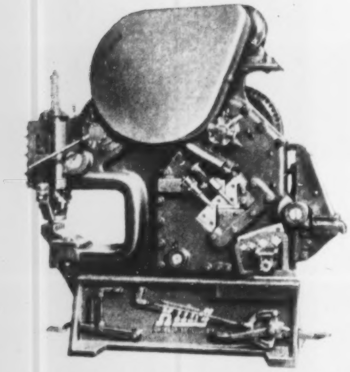
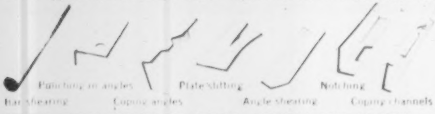


Seven typical jobs, seven different operations on this one machine: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One of these Kling Machines can turn out the work of a separate punch, angle shear, bar shear, plate shear and notcher—yet it costs little more than a single-purpose punch. For speed and safety, each end operates independently. Foot pedals allow both operators to keep hands free to hold work. Available for light, medium or heavy work.

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Get hair-line precision as well as speed, in sheet and plate cutting, whether you do one or many of the operations shown. One Kling Shear will often eliminate the need of several old-style shears or other equipment. Many attachments available. A wide range of types and sizes to meet your specific requirements, up to a rated capacity to shear 1" thick mild steel.

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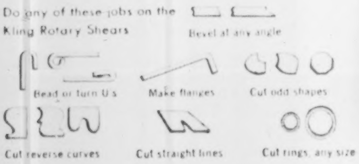
Do any of these jobs on the Kling Rotary Shears
Bevel at any angle
Bead or turn U's
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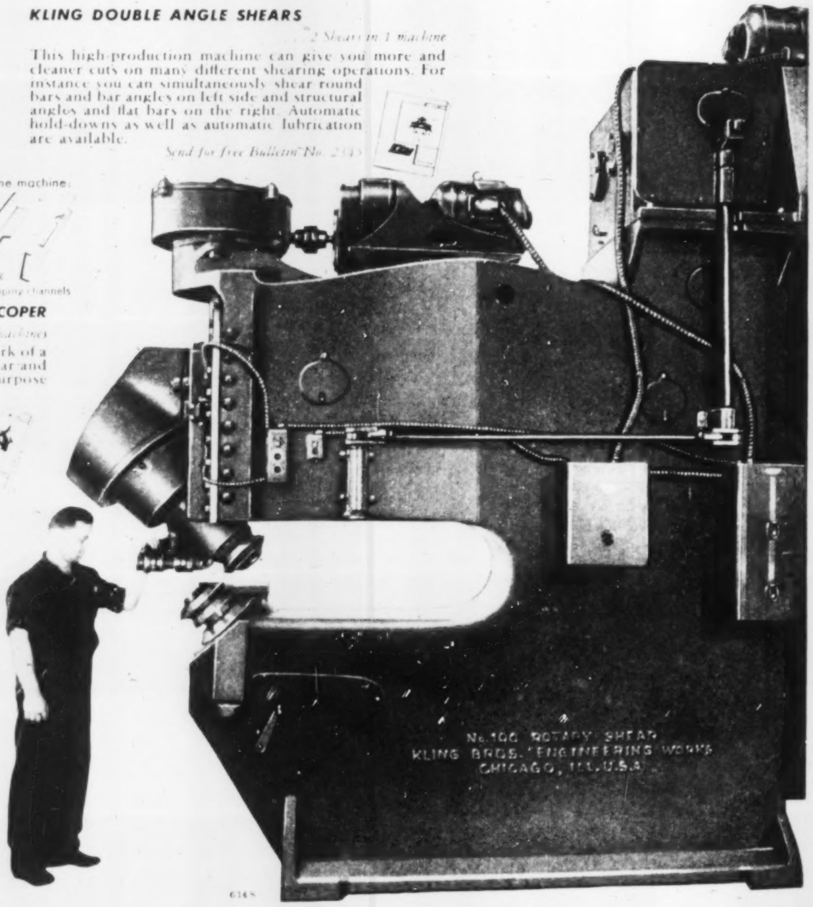

No. 100 ROTARY SHEAR
KLING BROS. ENGINEERING WORKS
CHICAGO, ILL. U.S.A.

6148

(Continued from p. 136)

the rise. Last year our vehicle-miles reached about 500 billion.

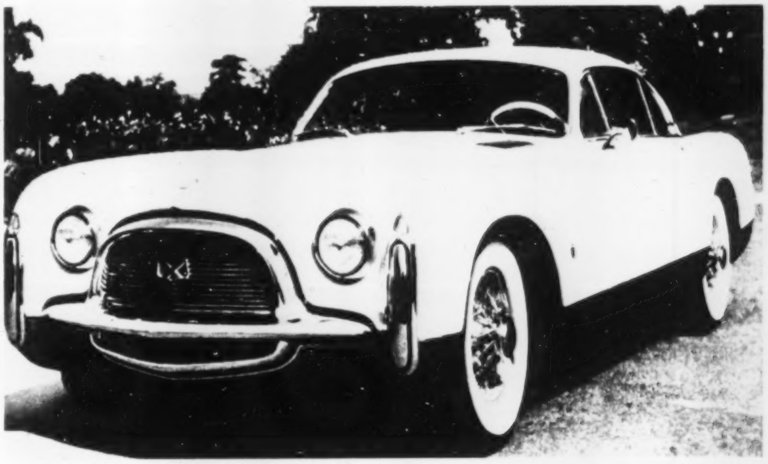
Sanity Returns—Last year saw more sanity return to the used car market with the result that price ceilings on most models are far higher than the public is willing to go. The trade expects this year to sell almost two used cars for each new car. The record-breaking production of 1950 and the highly satisfactory 1951 output will feed this year's used car market with relatively young models.

The more cars, new and used, available to dealers the less likelihood there is of gouging. In 1953 the man with a car to trade will find dealers anxious to dicker, and discounts for "clean" deals where no trade is involved are possible.

Catch the Fancy — Sports cars caught the public's eye with startling rapidity last year. And the automakers realized that they were not offering anything for a discerning and well-heeled part of the total market. From the hot-rod and sports car cult were coming ideas and engineering talent which suddenly looked important enough to be considered. Chrysler Corp. took a liking to these enthusiasts as soon as it realized it had something in the way of engines to interest them. The company's development of a modified stock engine capable of Indianapolis Speedway racing is one result. Other automakers have had other ideas about the sports car minded.

Two manufacturing developments have taken on greater significance because of the interest in sports or low volume cars. The West Coast with its numerous fanciers of custom bodies took to fiber glass and polyester resin laminates with fervor, and an infant body building industry is now lustily banging on its high chair for Detroit's attention—and getting it.

For the Small—The work being done by small shops is much better known at the moment than that going on in motordom's experimental garages. One major automobile producer has failed repeatedly to get the good results with the materials which alley operators report. Nevertheless suppliers of the raw materials say that plastic bodies will one day appear from Detroit's auto plants. If they do they will probably be of less commercial significance than the use of plastics for portions of high production cars. An engineer in a GM division indicates that its first use of plastic laminates will probably be for hoods, deck lids and similar panels, rather than complete bodies. Fenders for Chrysler cars have already been experimentally produced. Kaiser-Frazer may be the first automaker to give the public its chance to buy a factory-produced plastic bodied car when it assembles outside-purchased bodies on Henry J chassis this summer.



NEW CARS: Opulence in the extreme and automatic devices galore will be the vogue in still-unveiled new models. Many of the features have been tested in such experimental models as this Chrysler "Special" sport coupe built in Italy

The acceptance of plastic draw dies by the automotive industry is the other spectacular development pertaining to modest volume production runs. It got its automotive send-off when Dodge Truck Division last year applied it to certain truck steel stampings with notable success and at a die cost half that of conventional metal dies. The material is incapable of standing up to the high production runs needed for many automotive parts and is not applicable to blanking, trimming, or punch dies. But it is finding a specialized niche in plants of Chrysler, General Motors, and Ford and several independents.

Bellwether? — An all-aluminum marine diesel engine developed by Packard for Navy use initially and commercial application later has affected the automotive industry's thinking. Just how seriously some other industry members are taking this innovation is indicated by the decision of one to postpone its plans for construction of a new engine foundry until a closer examination into aluminum's potential can be made. Packard, some observers believe, may eventually become an aluminum automobile engine supplier to other industry members. Its work in this direction is regarded as a possible explanation for the apparent stalling of a projected new conventional engine tooling program. Nash, Kaiser-Frazer and Dodge are others whose work with aluminum engine designs will bear watching.

Some proponents of aluminum believe its automotive use will be boosted substantially when 1954 models appear. Some cast transmission components, for example, were redesigned for iron when aluminum use was restricted and will return to aluminum this year. Aluminum pistons will be universal in the passenger car industry this year for the first time.

Magnesium's place in the land transportation industries is growing but the advantageous applications do not yet appear as numerous as those for aluminum.

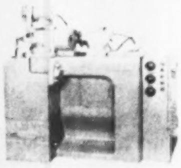
Truck Development — The gas turbine-propelled truck which has

(Please turn to p. 142)

bryant
internal grinding

no. 1309-W

Finishes 2 bores and a taper straight and concentric. 2 wheelheads are used on this semi-automatic. Max. traverse stroke, 6″. Max. grinding length, 3½″.

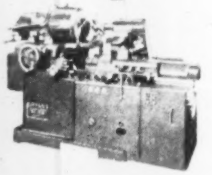


no. 1109

For high production of small bores where accuracy of size and finish are required. Max. traverse stroke, 6″. Max. grinding length, 3½″.

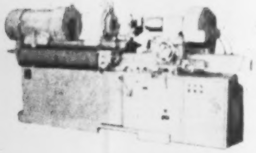
no. 1316

Two wheelheads for high production of jobs requiring face and bore, or face and O.D. grinding. Max. traverse stroke, 20″. Max. grinding length, 8″.



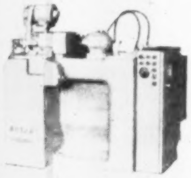
no. 1116

A general purpose hole grinder for tool room, small shop, or general production. Maximum traverse stroke, 20″. Maximum grinding length, 8″.



no. 1416

Specially designed for grinding bores in long work, such as machine tool spindles. Maximum traverse stroke, 20″. Maximum grinding length, 8″.

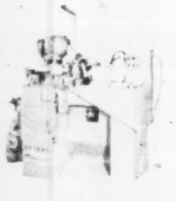


no. 1209

A fully automatic, high production machine for small and medium bore grinding. Max. traverse stroke, 6″. Max. grinding length, 3″.

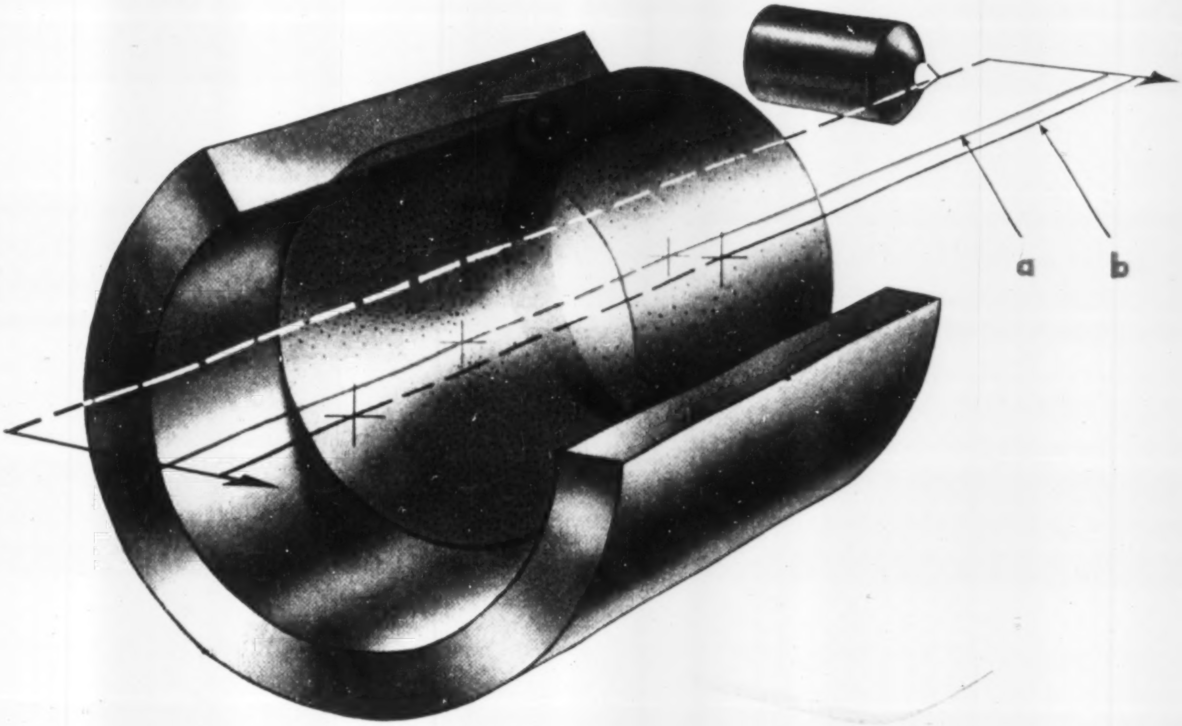
no. 1460

For production or single piece hole grinding on parts up to 60″ diameter. Max. traverse stroke, 21″. Max. grinding length, 16″.



no. 2209

For precision and high production grinding of ball bearing races, gears, rolls, bushings, etc. Max. traverse stroke, 6″. Max. grinding length, ¾″.



THE heart of the internal grinding process is the line of contact between the wheel and the work. This contact line must be straight for the full length of the wheel and the full length of work as the wheel traverses. If the contact is not a straight line, the internal grinder is "out of line". Improper alignment may show up in the work as incorrect hole geometry (bell-mouth or taper) and poor surface finish. In addition, excessive wheel wear and poor wheel action may result.

Several elements contribute to the straightness of this line of contact: first, the path along which the wheel is traversed "a" must be a straight line; second, the axis of the wheel must lie in a plane parallel to the wheel path "a", and third, the axis of the work "b" must be parallel to the wheel path "a". For production grinding, the diamond must lie in the plane established by the wheel axis and the work axis.

Perfect alignment means that the slides must be straight and true, the wheel and work spindles must be in line and "zeroed" for center heights and the diamond must be on "dead center" of the wheel. A full, straight line of contact will extend wheel life, improve wheel action, and will assure correct geometry and required finish.

Bryant Chucking Grinder Company

Springfield, Vermont, U. S. A.

Internal grinders • Internal & External thread gages

(Concluded from p. 139)

gone into commercial use on the West Coast is not being ignored by the industry. This truck is powered by an engine made by Boeing which has set up a small production line. The English "Rover" car with a gas turbine also has drawn motordom's attention. General Motors, for one, is working on a gas turbine for probable installation in a GMC bus.

Such complete changes in automotive power plants are not on the near-by schedule. In 1954 models, instead, there are likely to be several new overhead-valve V-8 high compression engines. At least two of these had been indicated for 1953 use but log-jams in machine tool builders' plants for the past two years delayed them. Indications are that Ford and Mercury will have completely new engines in 1954, Pontiac and Chevrolet stand good chances for them, and Plymouth may be able to tool for a new six or eight cylinder engine.

Matter of Styling — Last year saw divergent styling trends emerge. Wheelbases of some cars were shortened, others were lengthened. Over-all lengths, however, are at about maximum. Better utilization of passenger compartment space has been made without major changes in exterior dimensions as engine compartments have been re-engineered for the shorter, more compact and often lighter V-8 engines. Two big areas in which the chassis engineers are currently working are in suspension improvements and engine-transmission - rear - axle relationships. The Thompson Products-developed, Lincoln - adopted ball joint front-wheel suspension system is understood to be planned for Ford and Mercury use, possibly in 1954 models. Other car makers are working to improve the road-holding ability of their products, a point at which foreign cars presently excel. Power steering will become available for low priced cars, possibly even as a standard item if costs can be sufficiently reduced. Automatic transmissions are in interim development stage.

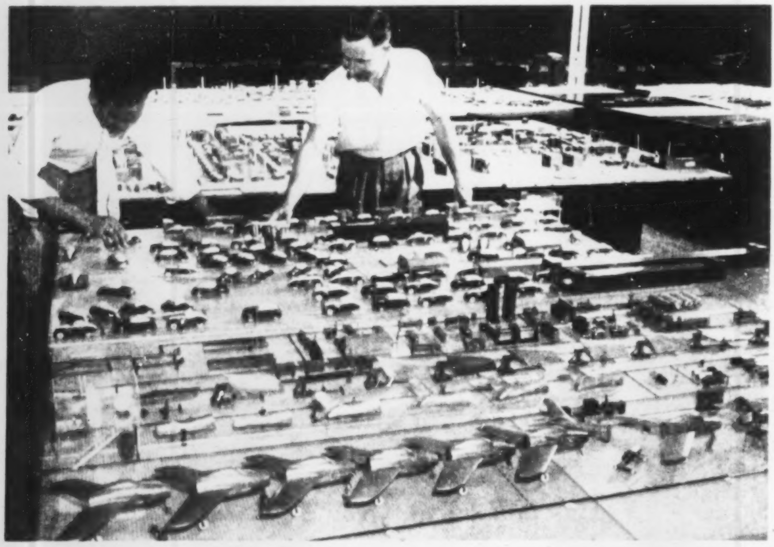
One manufacturer this year will offer two rear axle choices so the buyer can select economy or performance. The compromise rear axle ratios selected by most companies fail to satisfy both needs completely. In the interest of better economy with no sacrifice in performance the high compression engine trend has come to the fore. An eight-to-one compression ratio was regarded a year ago as too high for the then-unpredictable high octane gas supply, but a new engine to be introduced this month will have an 8.5-to-1 ratio and others will be over the 8-to-1 figure. Emphasis on automotive engineering is indicated in a very tangible way—new facilities. Each of the Big Three has expansion underway for its engineering department.

Matter of Cost—Manufacturing facilities can be given an assist in the decision of most automakers to hold or reduce their car prices. In the past year numerous highly mechanized plants have come into production. How much these plants have cut from manufacturing costs is, of course, imponderable, but they, and the prospects of higher output, have undoubtedly offset higher materials and labor costs for many companies.

Some dislocation to the industry was inevitable as it built plants and tooled up for potentially large-scale military equipment production. Most of these facilities will be in operation this year; jet engine and airframe facilities, on the whole, have been the slowest to materialize because of the long delivery dates on highly specialized machine tools and jigs and fixtures, but output from this part of motordom's contribution to preparedness will be on an ascending scale throughout this year.

Testing Ground — The military tank and truck stretch-out announced in December has significance of a special sort. The lengthening of the defense program while the monthly production rate is reduced will test the gloom prophets' warning that the high business level depends largely on defense spending. The auto industry confidently believes its market will support as many additional civilian cars and trucks as can be made with the extra manpower, plant space and materials which the stretch-out releases.

The labor shortage in auto plants has become an increasingly serious problem and the anticipated higher civilian vehicle production in 1953 is predicated on longer workweeks or higher employment or both. In 1952 motordom's employment totalled 785,000 of which 640,000 were production workers, against the 1951 and 1950 totals of 856,300 and 839,400 people, respectively.

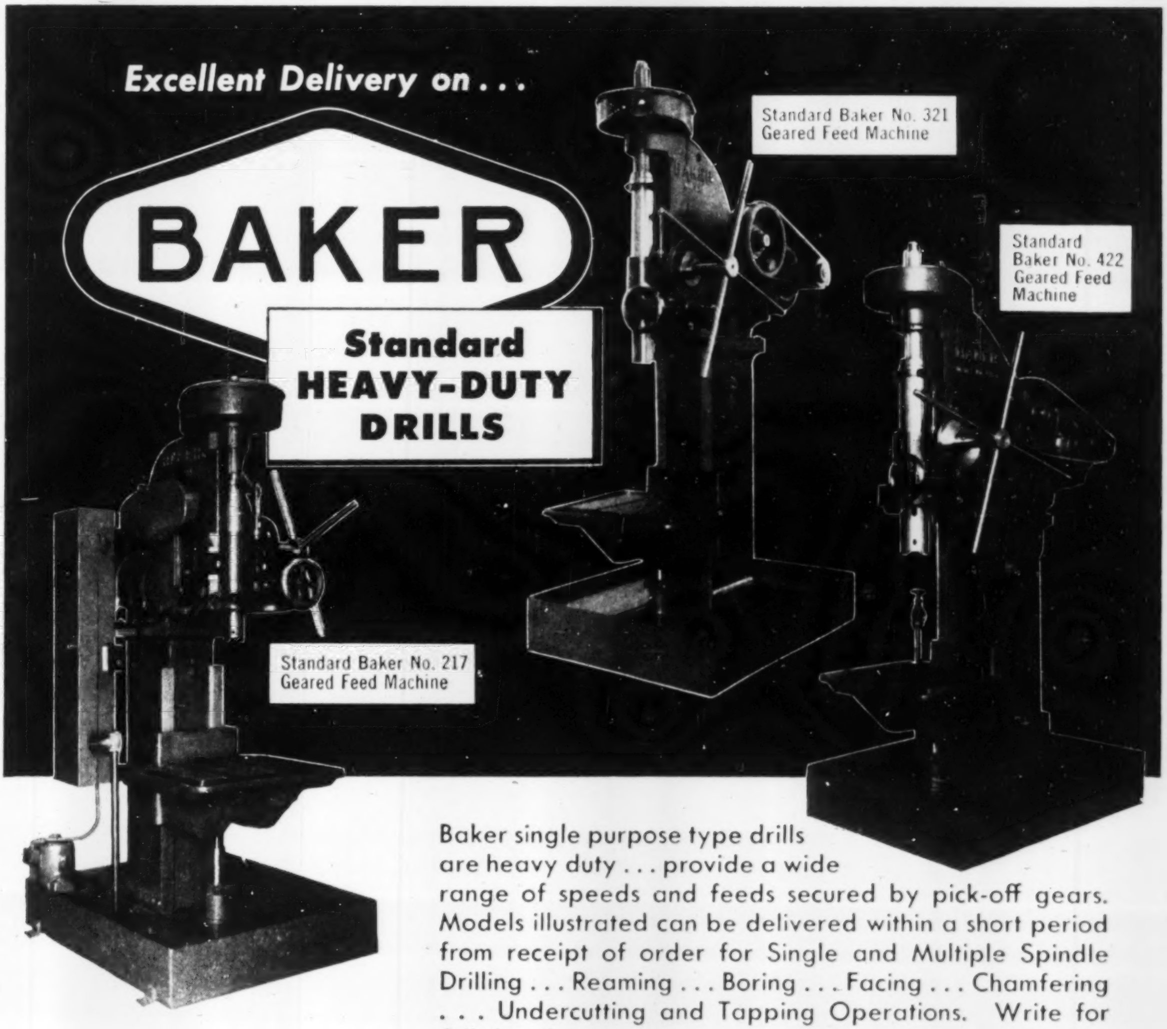


NEW PREPAREDNESS CONCEPT: Championed by General Motors' C. E. Wilson, the dual-plant idea takes definite shape in the 43-acre Buick-Oldsmobile-Pontiac assembly plant at Kansas City, Kans. The aircraft are F84F Thunderjets

Excellent Delivery on . . .

BAKER

Standard HEAVY-DUTY DRILLS


Standard Baker No. 321
Geared Feed Machine
Standard Baker No. 422
Geared Feed Machine
Standard Baker No. 217
Geared Feed Machine

Baker single purpose type drills are heavy duty . . . provide a wide range of speeds and feeds secured by pick-off gears. Models illustrated can be delivered within a short period from receipt of order for Single and Multiple Spindle Drilling . . . Reaming . . . Boring . . . Facing . . . Chamfering . . . Undercutting and Tapping Operations. Write for full details.

MAJOR SPECIFICATIONS—Single Purpose Types

	217	321	422
1. Capacity—Max. Dia. Drill in S.A.E. 1035 Steel	2	3	4-1/2
2. Max. H. P. Motor used	10	15	20
3. Distance center of Spindle to Frame (Gap)*	12-1/4"	12-1/4"	12-1/4"
4. Maximum Spindle Travel	12"	16"	16"
5. Spindle—Outside Dia. splined driving end	2"	2-13/16"	3-1/4"
6. Dia. of Spindle Sleeve	3-1/4"	4-1/4"	5-1/4"
7. Dia. of Spindle Nose	3.225	4.225	5.225
8. Morse Taper in Spindle as standard	No. 5	No. 5	No. 6
9. Standard Speed Range in R.P.M.	76-614	27-220	20-165

*Can be increased 3" by use of offset Spacer Block.

Baker Brothers, Inc.
Toledo, Ohio

Gentlemen:

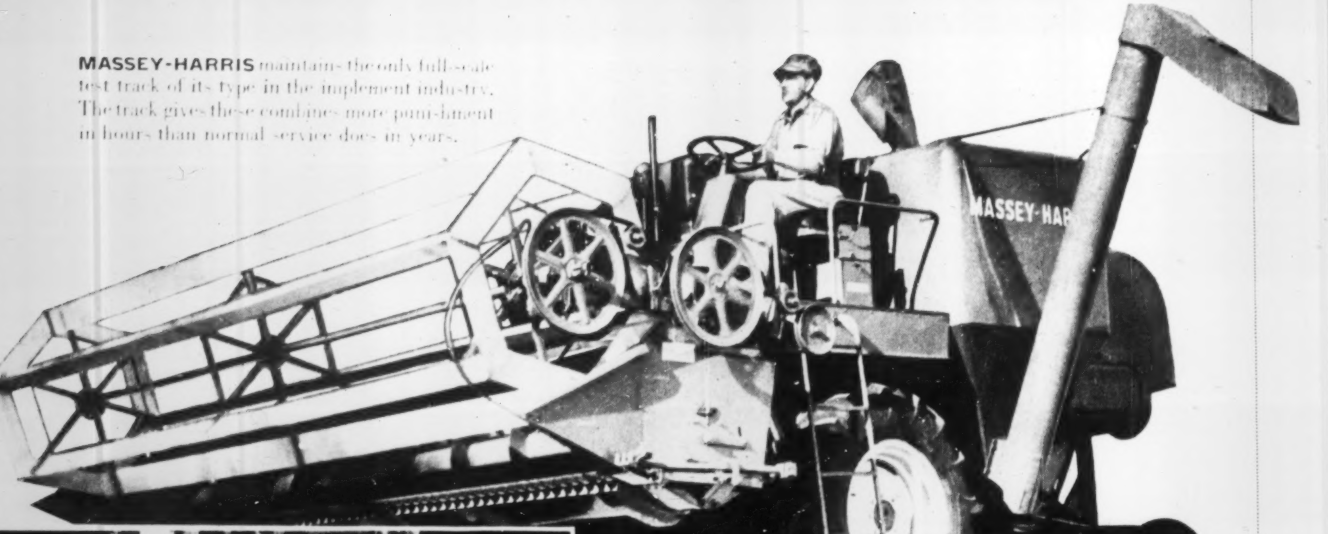
Please send more information on Baker Standard Drills to:

NAME..
COMPANY.....................................
STREET...
CITY..........................STATE..........

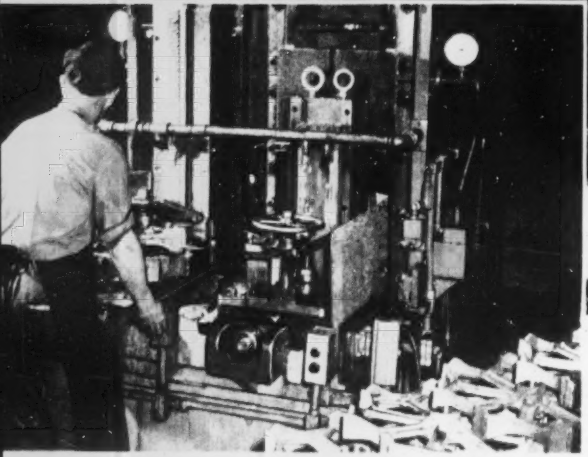
. . SINCE 1867

BAKER BROTHERS, INC. Toledo, Ohio

DRILLING . . . TAPPING . . . KEYSEATING and CONTOUR GRINDING MACHINES



MASSEY-HARRIS maintains the only full-scale test track of its type in the implement industry. The track gives these combines more punishment in hours than normal service does in years.



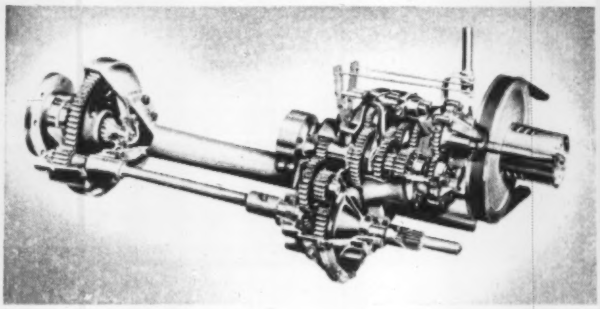
SUNOCO EMULSIFYING CUTTING OILS are used in machining many precision parts. Being broached here are cylinder ends which hold the thresher bars. It is their function to maintain the thresher bars in close alignment with the concave bars to provide efficient operation.

MANY PARTS OF NEW MASSEY-HARRIS COMBINES MACHINED WITH SUN CUTTING OILS

The new Massey-Harris Self-Propelled Combines are precision mechanisms. They are as perfect as a century of experience, modern engineering and production can make them. Sunoco Emulsifying Cutting Oils are used in machining close tolerance parts; Sunicut Cutting Oils are used where an emulsifying oil is not suitable.

"Test it on the track—prove it in the field." That's the Massey-Harris way of insuring the quality of their products. Sun products play an important part in maintaining their high standards.

To learn the right cutting oils and lubricants for your job, consult a Sun representative. You will find his services practical, reliable and complete. Write or call Sun Oil Company, Philadelphia 3, Pa.



SUN LUBRICANTS are used in many of these self propelled combines for gear and crankcase lubrication. Massey-Harris selected these Sun products because they meet their unusually high standards.

SUN INDUSTRIAL PRODUCTS SUNOCO

SUN OIL COMPANY, PHILADELPHIA 3, PA. • SUN OIL COMPANY, LTD., TORONTO AND MONTREAL

Men of Industry

Samuel D. Bullock was promoted to vice president of **Burroughs Mfg. Co.**, Kalamazoo, Mich., subsidiary of American Metal Products Co. He will continue as director of purchasing and scheduling for the parent firm.

Arthur S. Armstrong was elected president of **Cleveland Twist Drill Co.**, Cleveland, to succeed **Jacob D. Cox** who becomes chairman of the board. Mr. Armstrong has been with the company for 20 years and in 1949 was made executive vice president.

ARTHUR S. ARMSTRONG
. . . heads Cleveland Twist Drill

GEORGE O. SHUTZBAUGH
. . . joins Alloy Eng. & Casting

Midland Co., South Milwaukee, Wis., appointed **Mel Olson** purchasing agent. **George Phillips,** for the last several months acting purchasing agent, now serves as assistant in that position. Mr. Olson formerly served as purchasing agent of Clay Equipment Corp. and Graver Tank & Mfg. Co. Inc.

C. Howard Paul, secretary and treasurer of **Mackintosh-Hemphill Co.**, Pittsburgh, was elected a vice president of the corporation. He joined the firm in 1917 and became comptroller in 1924. Mr. Paul was named assistant secretary-treasurer in 1929 and became secretary and treasurer in 1936. He has been a director since 1944.

Don R. Berlin, vice president and general manager, McDonnell Aircraft Corp., was elected president of **Piasecki Helicopter Corp.,** Morton, Pa. He succeeds **C. Hart Miller** who becomes executive vice president and general manager.

George O. Shutzbaugh joined the research and development staff of **Alloy Engineering & Casting Co.,** Champaign, Ill., as an associate director of armed services research and development projects. He formerly was assistant chief of the Ferrous and Nonferrous Metal Section, Directorate of Industrial Resources, Headquarters, United States Air Force. Previous to recall to active duty in the Air Force, he was plant manager of the Southern Illinois Foundry Co., Carmi, Ill.

Holo-Krome Screw Corp., Hartford, Conn., manufacturer of H-K cold forged socket screw products, appointed **Richard A. Modig** as general sales manager. He has been New England representative of the company since 1935.

J. Robert Jones was appointed sales manager for standard machines of **Kearney & Trecker Corp.,** Milwaukee. Formerly assistant branch office manager at Detroit, he succeeds **Henry H. Lentzner,** newly named manager of the special machinery division. **William G. Huseby,** export representative, was named assistant sales manager for standard machines.

Beals, McCarthy & Rogers Inc., Buffalo, appointed **Paul Driver** manager of its steel warehouse. He succeeds **Charles Hyne,** retired.

John M. Bandel was appointed vice president of **Electro Metallurgical Co.,** New York, division of Union Carbide & Carbon Corp. He has been with the Electromet organ-

JOHN M. BANDEL
. . . Electro Metallurgical V. P.

RICHARD A. MODIG
. . . heads sales at Holo-Krome Screw

ization since 1941. For the last seven years he was assistant to **E. H. Mangan,** who recently was made executive vice president of the company.

Taco Heaters Inc., Providence, R. I., appointed **E. T. Houlihan** as manager of industrial and refrigeration department, a new department. He has been with Taco since 1930 and has acted in a sales executive capacity for the last ten years. **Robert T. Angevine** was named assistant sales manager, heating manufacturers package equipment. **Howard E. Lucas** was made regional sales manager for Maryland, North Carolina, South Carolina, Virginia and Washington. **William J. Sliney** is regional sales manager for southern New Jersey, eastern Pennsylvania and Delaware.

Albert A. Sickeler was appointed general manager, **Electroweld Mfg. Corp.,** Erie, Pa.

J. V. Naish was elected executive vice president, **Consolidated Vultee Aircraft Corp.,** San Diego, Calif. He is succeeded as director of sales and contracts by **J. G. Zevely,** who advances from the post of manager of contracts for Convair's San Diego division. Mr. Naish was elected vice president-contracts in June, 1950.

ARTHUR J. ELBERT JR.
. . . *National Tube pipeline sales*

Arthur J. Elbert Jr. was appointed manager of sales of pipelines, a newly created position in the general sales department of U. S. Steel Co.'s **National Tube Division,** Pittsburgh. He has been with National Tube since 1937. He was named special representative handling trunk pipeline sales in 1950.

William E. Judd, sales manager of the South Wind heating equipment division, Indianapolis, since 1949, was appointed assistant to **James S. Knowlson,** president and board chairman of **Stewart-Warner Corp.** He fills the vacancy created by appointment in August of **Leonard L. Robb** as head of wholesale sales of Alemite lubrication equipment and Stewart-Warner instruments. Mr. Judd is now located in Chicago.

J. F. Knoff was named vice president and general sales manager of **Chrysler Corp.'s** Airtemp Division, Dayton, O. Associated with the division for nearly eight years, he has served since 1951 as general sales manager.

Supervisory appointments at the Butler, Pa., plant of **Armco Steel Corp.** include **Edward M. Norton,** named administrative assistant to the manager; **Frank Burdette** as superintendent of the processing department; and **Joseph C. Slater** as superintendent, strip coating and silicon department succeeding Mr. Burdette.

Raymond G. Fisher was appointed director of economic research, **Continental Can Co.,** New York.

H. J. Van Buskirk was appointed Pittsburgh district manager for **DeWalt Inc.,** subsidiary of American Machine & Foundry Co.

W. J. Hegerty was appointed sales manager, chemical and process equipment division, **Colonial Iron Works Co.,** Cleveland. He has served for the last five years as manager of the New York district office. Prior to that he was with

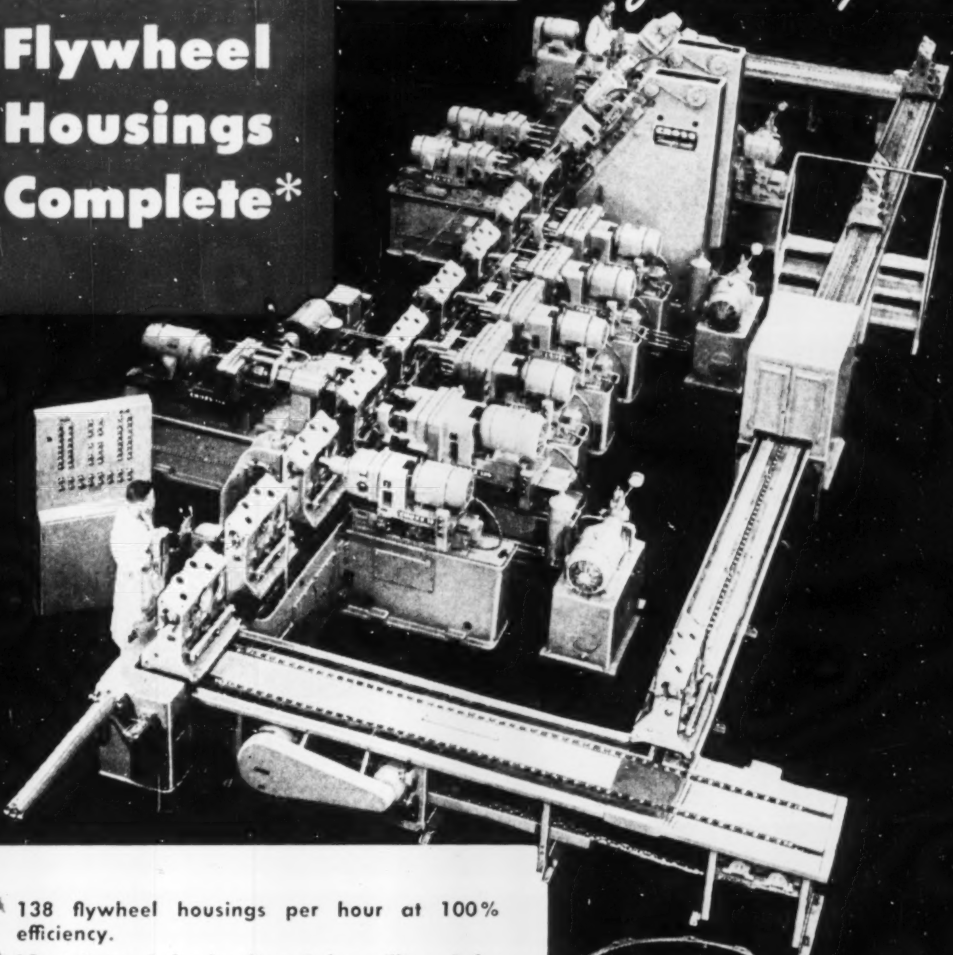
J. V. NAISH
. . . *Convair exec. V. P.*

WILLIAM E. JUDD
. . . *assists Stewart-Warner president*

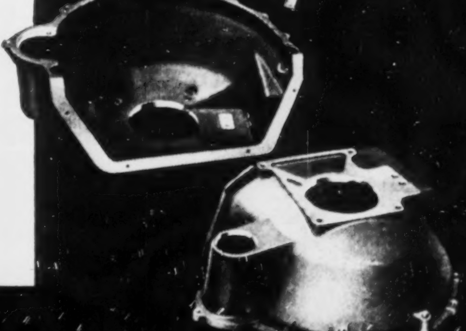
W. J. HEGERTY
. . . *div. mgr. at Colonial Iron Wks.*

Machines Flywheel Housings Complete*

Another Transfer-matic by Cross



- ★ 138 flywheel housings per hour at 100% efficiency.
- ★ 13 stations—1 for loading, 1 for milling, 1 for rough boring, 6 for drilling and chamfering, 2 for tapping, 1 for finish boring and 1 for unloading.
- ★ Palletized work holding fixtures hold parts securely during all operations.
- ★ Vibrating type conveyor automatically removes chips.
- ★ J.I.C. standard construction.

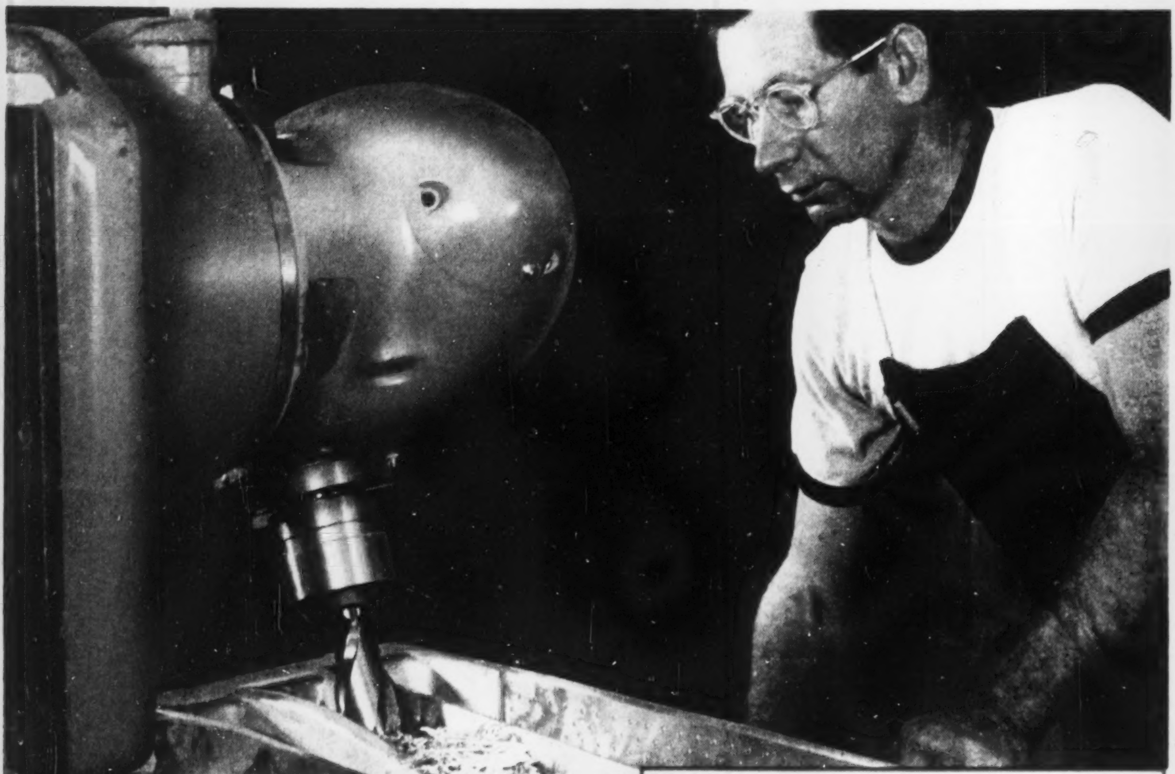


*Except for disc grinding three faces.

Established 1898

THE CROSS CO.
DETROIT 7, MICHIGAN
Special MACHINE TOOLS

CK MILLING MACHINE SPEEDS OUTPUT OF STANDARD PRODUCTION PARTS



CK MILLING MACHINE FEATURES THAT HELP DO THIS JOB BETTER

This CK milling machine has 24 different spindle speeds (13 to 1300 rpm). Its 32 different table feeds ($\frac{3}{8}$ to 90 ipm). Operator was able to pick proper *speed and feed*, benefit from high hp. modern tools.

Greater rigidity of new CK column easily absorbs vibration from heaviest cutting load. Only single pass needed for each part.

CK's 3-bearing spindle and flywheel assures Maximum Cutter Efficiency. On this job, it meant fast metal removal and excellent finish in a single pass.

CK's new heavy duty (2" dia.) table feed screw gives greater bearing contact for smoother feed performance and sustained accuracy.

New CK machines have greater horsepower. On this job, 25 hp permitted operator to get maximum production from his modern cutter.

TEN ALUMINUM ALLOY 75ST (FORGING) AIRCRAFT SPARS PRODUCED EVERY HOUR FOR MAR VISTA ENGINEERING CO.

THE FACTS ON THIS JOB ARE: **Machine**: No. 6 — Model CK Plain (25hp) with heavy-duty universal Milling Attachment. **Part**: Large fusilage spar fitting — overall dimensions $39\frac{5}{16}$" x $17\frac{3}{8}$". **Material**: Aluminum Alloy 75ST (forging). **Tool**: 2-inch, 2-lip end mill. (HSS). **Speed**: 265 rpm. **Feed**: $3\frac{1}{8}$ imp.

HERE'S a typical example of how relatively inexpensive tooling greatly increases the application of Kearney & Trecker's new CK milling machines . . . producing a completed part every 6 minutes. Two operations were required for each part — one, milling out the holes and recessing on the edges, then after changing the attachment setting and cutter — two, finishing the inside (see photo). For the full story, contact your nearest Kearney & Trecker representative or write: Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wisconsin.

KEARNEY & TRECKER
MILWAUKEE
MACHINE TOOLS

ADAM ZANDEL
. . . *Loewy engineering post*

Edge Moor Iron Works. His headquarters now are in Cleveland.

Adam Zandel was named executive engineer in charge of administration of the engineering department at **Loewy Construction Co. Inc.,** subsidiary of Hydropress Inc.

Yale & Towne Mfg. Co. appointed **Hugh J. Mathews** plant manager at Stamford, Conn., and **John E. Charleson,** plant manager at Lenoir City, Tenn., where a new factory is now under construction. In these posts, both managers will direct all operations at their respective plants with the exception of sales and advertising. Mr. Mathews served as assistant to the general manager of the Stamford Division, and has been associated with Yale & Towne for 45 years. Mr. Charleson joined the company 30 years ago, and had been superintendent of the Stamford finishing departments.

Norman E. Risk and **Richard S. Frank** were named assistant chief engineers at **Caterpillar Tractor Co.,** Peoria, Ill. The following were named general supervisors: **George Lundberg, Paul Benner, Carl Kepner, Bill Johnson, Harry Budelier** and **Bob Bonney.**

Seven executive engineers and six chief engineers have been appointed in Chrysler Corp.'s engineering division expansion. The new executive engineers, all formerly chief engineers in their respective sections, are: **T. C. Ackerman,** laboratories; **A. B. Couture,** laboratories; **A. B. Soherreshoff,** development design; **P. J. Kent,** electrical; **E. P. Lamb,** truck engineering; **F. W. Slack,** chassis design; and **U. L. Thomas,** body engineering.

Six former assistant chief engineers to become chief engineers are: **H. E. Chesebrough,** body engineering; **A. G. Loofbourrow,** chassis design; **I. C. McKechnie,** electrical; **Karl Pfeiffer,** laboratories; **F. J. Tompkins,** truck engineering and **C. C. Upz,** ordnance.

Clearing Machine Corp., Chicago press manufacturer, appointed **Erwin J. Baumrucker** as executive assistant to **J. R. Bartizal,** executive vice president. Mr. Baumrucker has been associated with Clearing since 1937 and until recently was acting manager of Clearing's London, England, office. **David D. Wallace,** assistant treasurer, was named to manage the London operations. Associated with Clearing for 11 years, he will supervise manufacturing as well as sales in his new post.

ERWIN J. BAUMRUCKER
. . . *exec. asst. at Clearing Machine*

Philip P. Brown retired from **Detroit Steel Corp.,** Detroit, with which he has been associated for 23 years. A vice president since 1944, he has been in charge of steel purchasing mainly for the Reliance Steel Division. **Charles W. Bates,** Mr. Brown's assistant for several years, takes over this phase of his activities.

Electric Products Co., Cleveland, established the E. P. Switchboard & Control Division and named **G. J. Doss** general manager. He joined Electric Products in 1946 as manager of the Cleveland district office and in 1951 was advanced to assistant sales manager.

Sligo Inc., St. Louis, distributor of steel and industrial supplies, appointed **M. G. Duncan** steel division manager. He formerly was with Armco Steel Corp.

Standard Electric Division, Standard Dayton Corp., Dayton, O., appointed **James P. Gentry Jr.** sales manager. For many years, Mr. Gentry was eastern division sales manager for Joyce-Cridland Co.

International Business Machines Corp., New York, appointed **Ray W. Retterer** as administrator of IBM engineering. He previously was administrator at the Poughkeepsie, N. Y., laboratory.

George W. Stamm was appointed to the newly created post of assistant to the vice president in charge of sales, **Crucible Steel Co. of America,** Pittsburgh. He formerly was manager of the Cleveland sales branch where he is succeeded by **Robert C. Kuhn.** Mr. Stamm's

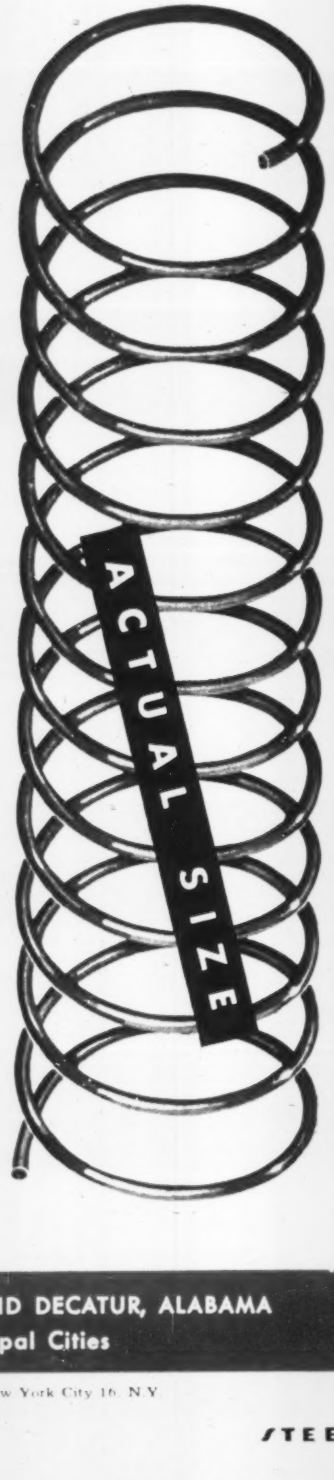
GEORGE W. STAMM
. . *sales assistant at Crucible*

Engineers, like you, prefer

CAPILATOR*

– the Wolverine capillary tube used for restriction purposes

because it is PLUG DRAWN



Through the special Wolverine process of plug-drawing this tiny tube a smooth, glass-like finish is imparted to the inside wall. This exceptionally fine surface assures a uniform and uninterrupted flow of liquids and gases through the tube.

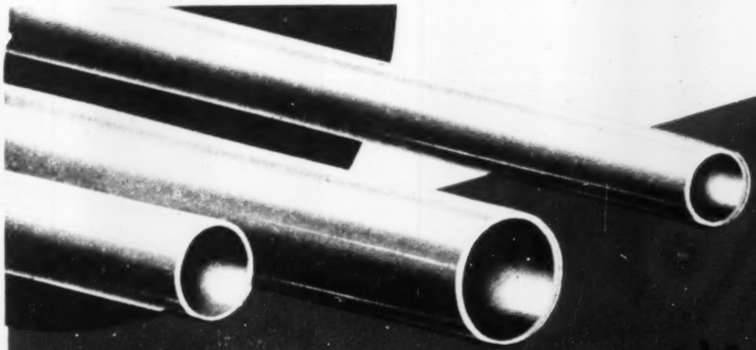
The Capilator is one of Wolverine's patented products developed to render controls more dependable and bring higher operating efficiency to the products you manufacture.

WOLVERINE TUBE DIVISION
of Calumet & Hecla, Inc.
Manufacturers of tubing exclusively
1439 Central Ave. **Detroit 9, Mich.**

*REG. U.S. PAT. OFF.

PLANTS IN DETROIT, MICHIGAN AND DECATUR, ALABAMA
Sales Offices in Principal Cities

Export Department, 13 E. 40th St., New York City 16, N.Y.



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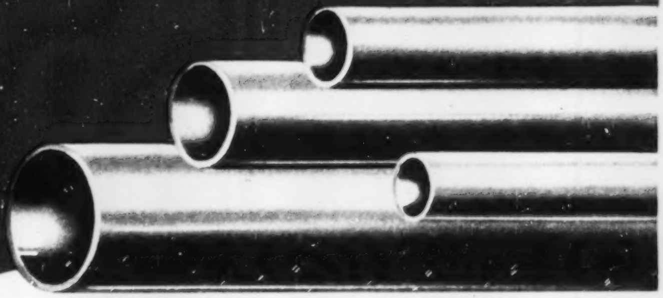

PLANTS IN DETROIT, MICHIGAN AND DECATUR, ALABAMA
Sales Offices in Principal Cities

Export Department, 13 E. 40th St., New York City 16, N.Y.

E. FORREST BAKER
. . . a sales director at Kaiser

C. W. HEPPENSTALL
. . . heads Kaiser heavy press plant

headquarters will be at Pittsburgh.

E. Forrest Baker was appointed forging product manager by **Kaiser Aluminum & Chemical Sales Inc.**, with headquarters in Chicago. He will direct sales activities relating to the heavy press forging program under which Kaiser Aluminum will operate forging presses for the Air Force at its Newark, O., plant.

Spranger Spring Co., Detroit, appointed **Raymond F. Jenzen** head of the engineering and sales departments.

Recordak Corp., subsidiary of Eastman Kodak Co., Rochester, N. Y., named **John K. Boeing** president to succeed **George L. McCarthy**, who becomes chairman of the board. Mr. Boeing has been vice president since 1943. He was also elected to the board of directors, as was **M. Wren Gabel**, vice president and assistant general manager of Eastman.

Raymond M. Eaton, superintendent and resident manager, **Hazard Insulated Wire Works Division**, Okonite Co., Wilkes-Barre, Pa., retired. He is succeeded as resident manager by **David W. Nurse**, former factory sales manager.

D. T. Branson, formerly with Durabilt Mfg. Co., is now associated with **Northwest Engineering Co.**, Green Bay, Wis.

C. W. Heppenstall was appointed manager of forging operations at the Air Force's heavy press plant for aluminum forgings at Newark, O., to be operated by **Kaiser Aluminum & Chemical Corp.** He formerly was vice president of operations and director of Heppenstall Co., Pittsburgh.

Clyde L. Jenkins was appointed superintendent of the materials and service department, and **Henry Watts** was made purchasing agent of **Goodyear Atomic Corp.**, subsidiary of Goodyear Tire & Rubber Co., Akron, which will operate the government's vast atomic plant now under construction in Pike county, Ohio.

John J. McPeak was appointed rim sales representative for **Goodyear Tire & Rubber Co.**, Akron. He goes to Goodyear from Motor Wheel Corp. of Lansing, Mich., where he served for the last 12 years as manager, merchandise sales division, and was associated for 24 years.

Everett Bernardo was appointed midwest sales representative for **H. H. Buggie & Co.**, Toledo, O. He will have headquarters in Chicago.

Robert P. Saunders and **Charles L. Saunders** have formed **Control Equipment Co.**, 1222 Peachtree St., Atlanta, sales agency representing leading instrument and allied equipment manufacturers.

John D. Potter, assistant treasurer of **Columbia-Geneva Steel Division**, San Francisco, U. S. Steel Co., was made treasurer following retirement of **John E. Barber**.

Harry A. Janke, formerly chief draftsman for **Bigelow-Liptak Corp.**, Detroit, was promoted to field service engineer. Other appointments include **Robert W. Jones** as assistant chief engineer, **Mahlon R. Huntton** as chief draftsman and **Casimer E. Wrobel** as assistant chief draftsman. The company engineers all types of industrial furnace enclosures.

CLYDE L. JENKINS
. . . position at Goodyear Atomic Corp.

HENRY WATTS
. . . Goodyear Atomic purchasing agent

LUBE OIL TEMPERATURE: NORMAL

In spite of high speeds and heavy duty

a Ross exchanger sees to that

Heavy shock or impact loading, high speeds or heavy duty are no threat to lube oil temperatures in Philadelphia Change-Speed Units. *A Ross Exchanger sees to that!*

Factory-installed by Philadelphia Gear Works, Inc., this compact Ross Exchanger keeps oil temperature within recommended limits. As a result, gears and bearings are never lacking of sufficient lubrication at required viscosity.

The use of Ross Type BCF Exchangers for this application, as for numerous others, has unique advantages for both machinery builder and user. Among them: Enduring all-copper and copper alloy construction; Completely standardized, pre-engineered designs to expedite procurement and simplify installation.

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DIVISION OF AMERICAN RADIATOR & STANDARD SANITARY CORPORATION
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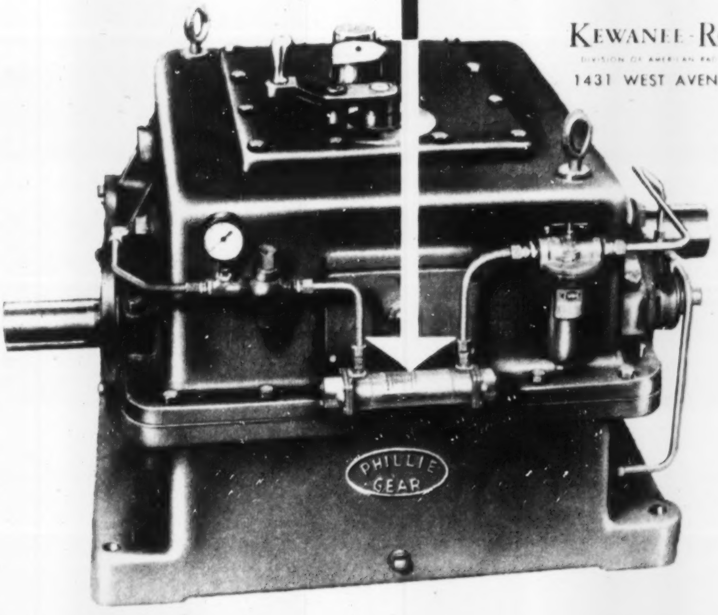

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"That PUNT certainly proves any assembly problem can be licked!"

Mike continued, *"What my company* found out making football shoes can help any manufacturer get better, more economical production. I'd say that includes your refrigerators, Tom."*

"How come?" said Tom.

"I never thought any screw would be just right for holding cleats to my football shoes. That's before the RB&W man came to my plant, and persuaded me to let RB&W try to develop one for me. Now I'm using RB&W screws that are ductile enough to go along with the impact, yet tough enough not to break. It just proves we should all pay closer attention to our fasteners. It really pays off!"

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Let RB&W help you make the most efficient use of fasteners on your assembly line. Address RB&W at Port Chester.

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107 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG

*Brooks Shoe Manufacturing Co., Philadelphia, Pa.

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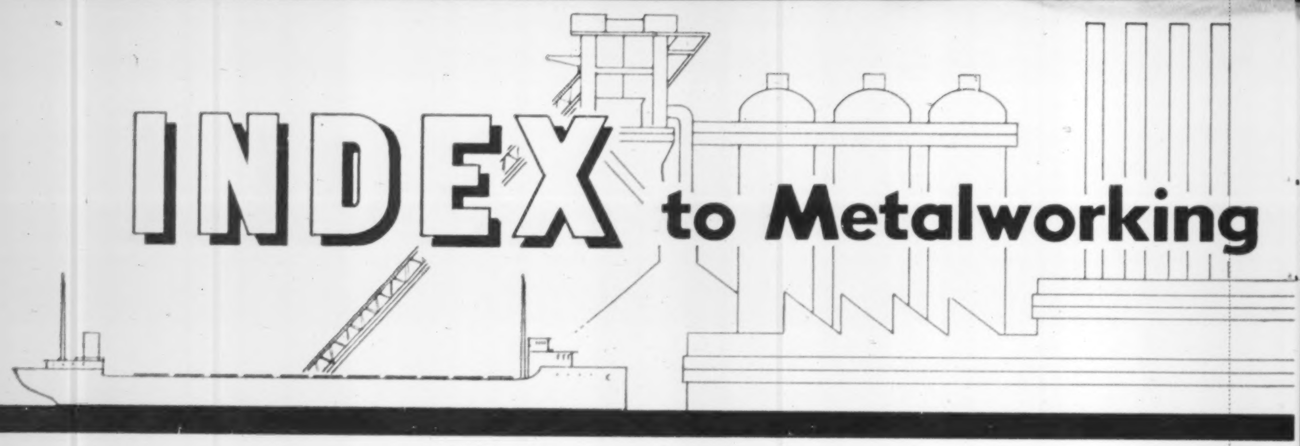
1953 METALWORKING FACTS and FIGURES

- This fifth annual edition of Metalworking Facts and Figures continues and brings up to date the statistics published a year ago. Within these 48 pages is a wealth of information you'll treasure throughout the year. The contents extend all the way from raw materials through to the end products of the metal consuming industries. Covered too are such related subjects as labor, prices and earnings. When you need figures on metalworking, look inside for the answer.



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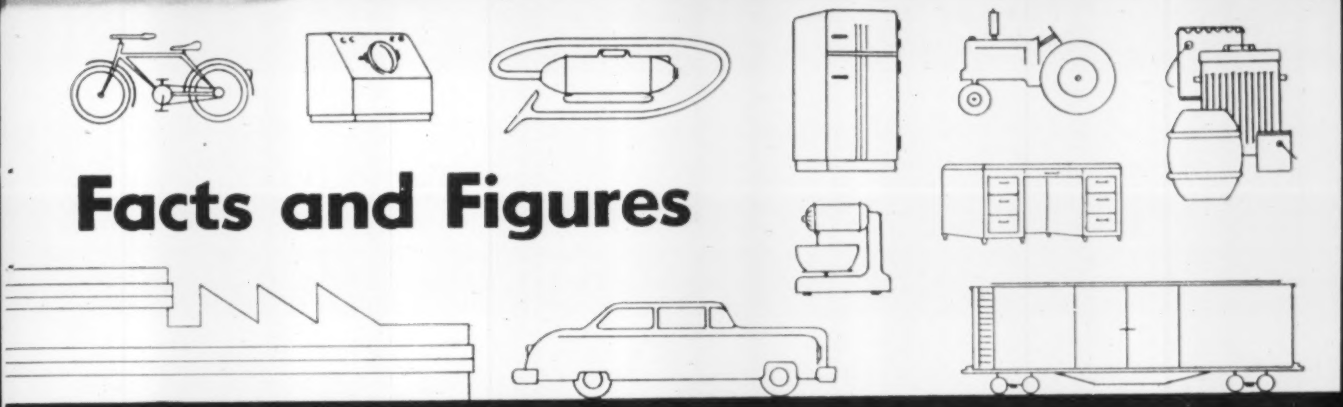

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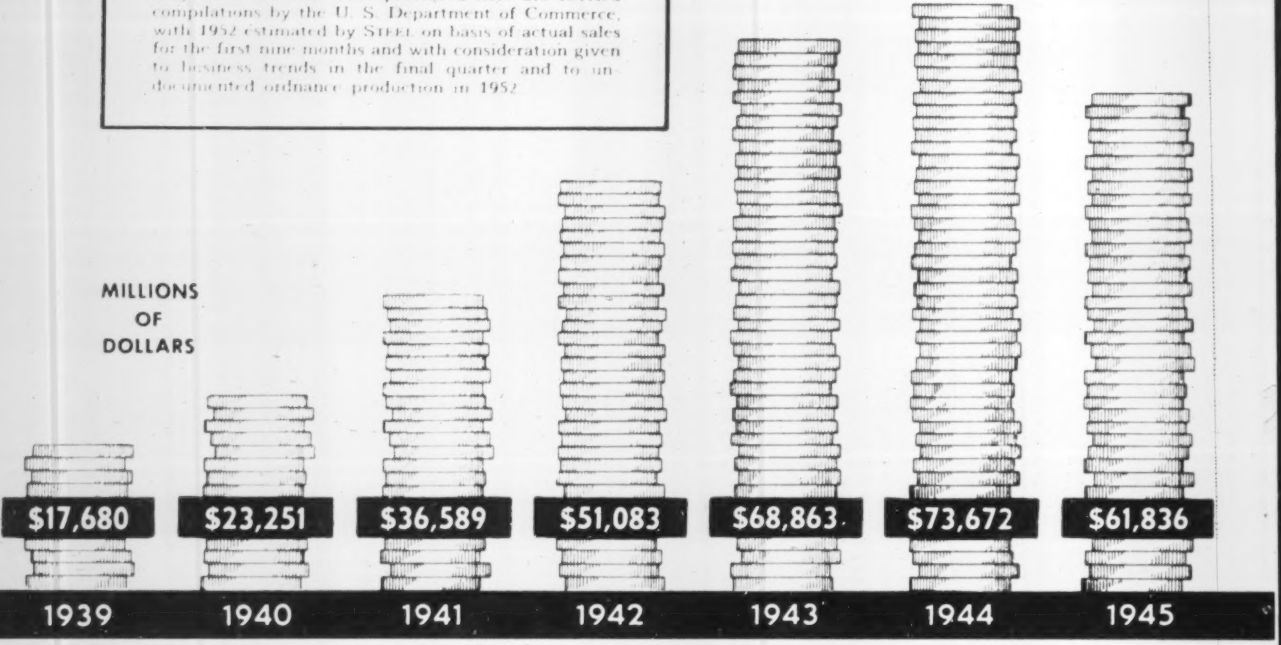
METALWORKING: *America's*

Manufacturers' sales in the metalworking industries in 1952 reached an estimated $111 billion, including $5 billion in undocumented ordnance production. This marks the third consecutive year a new record was set. Metalworking sales now are 6.3 times what they were in 1939. Data presented here are revised compilations by the U. S. Department of Commerce, with 1952 estimated by STEEL on basis of actual sales for the first nine months and with consideration given to business trends in the final quarter and to undocumented ordnance production in 1952.



MANUFACTURERS' SALES IN METALWORKING INDUSTRY†

(Millions of Dollars)

New Standard Industrial Classifications	Primary Metals	Fabricated Metal Products	Machinery Except Electrical	Electrical Machinery and Equipment	Transportation Equipment	Instruments	TOTAL Metalworking Industry
1952*	22,418	13,886	21,783	13,591	27,777	3,545	106,000‡
1951	21,105	14,120	21,396	12,170	25,465	3,080	100,336
1950	19,651	11,681	16,150	10,709	22,656	2,449	83,296
1949	14,744	9,159	14,079	8,288	18,717	1,978	66,965
1948	17,153	10,200	15,731	8,890	17,476	2,043	71,493

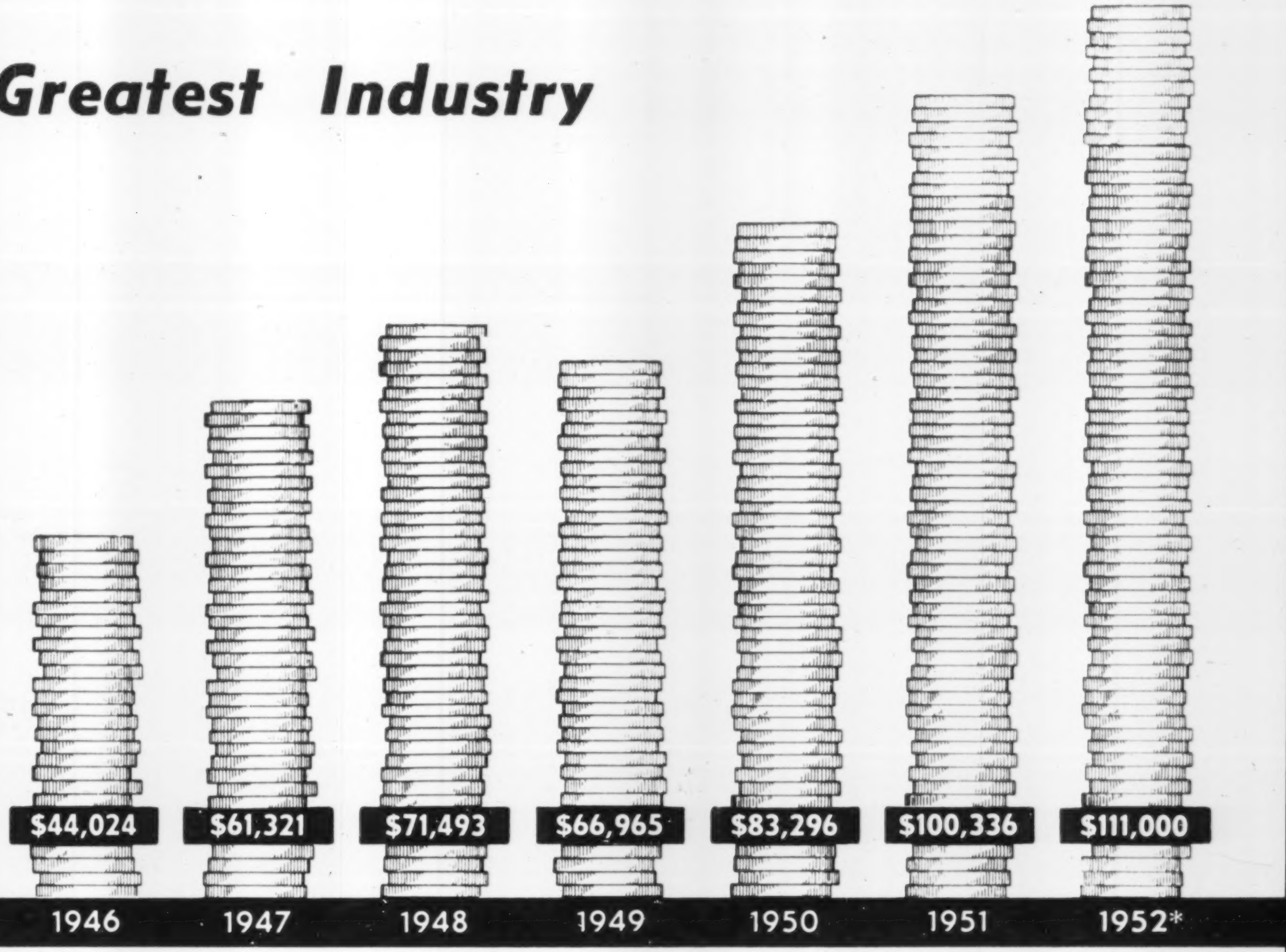
Former Industry Group Classifications	Iron-Steel and Products	Nonferrous Metal and Products	Electrical Mach. and Equipment	Machinery Except Electrical	Automobiles and Equipment	Trans. Equip. Except Automobiles	TOTAL Metalworking Industry
1948	22,188	5,946	9,024	15,658	13,662	3,818	70,296
1947	19,172	5,633	8,299	13,697	11,478	3,042	61,321
1946	14,202	4,705	5,658	9,824	6,624	3,011	44,024
1945	16,812	4,463	6,302	11,640	11,446	11,173	61,836
1944	17,795	4,755	7,104	12,907	15,096	16,015	73,672
1943	16,772	4,595	5,734	12,286	13,422	16,054	68,863
1942	14,563	3,411	4,550	10,370	7,956	10,233	51,083
1941	11,921	3,065	3,769	7,390	6,530	3,914	36,589
1940	7,678	2,120	2,483	4,697	4,697	1,576	23,251
1939	6,079	1,726	1,861	3,571	3,578	865	17,680

† Figures for 1948 and later represent a shift to the Standard Industrial Classification system. Data for 1948 are presented on the old industry group classification as well as the new.

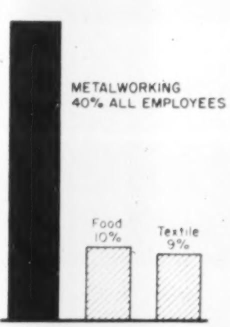
‡ Before allowance for undocumented ordnance production. Figure after such allowance is $111 billion.

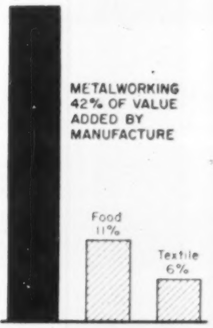
* Estimate for 1952 is by STEEL. Figures for other years are from Office of Business Economics.

Greatest Industry



HOW METALWORKING TOWERS OVER OTHER MANUFACTURING INDUSTRIES





	Standard Industrial Classifications	TOTAL NUMBER PLANTS†	NUMBER OF EMPLOYEES*	VALUE Added by Manufacture (Thousands)*
20	Food and Kindred Products	39,933	1,480,685	$10,694,708
21	Tobacco Manufactures	1,086	92,323	806,118
22	Textile Mill Products	8,185	1,239,121	5,624,030
23	Apparel and Related Products	30,960	1,128,892	4,174,430
24	Lumber and Products	26,231	748,963	3,165,760
25	Furniture and Fixtures	7,687	342,000	1,666,898
26	Paper and Allied Products	4,103	473,371	3,432,115
27	Printing and Publishing	28,986	759,065	4,902,972
28	Chemicals and Allied Products	10,073	640,199	7,236,618
29	Petroleum and Coal Products	1,387	206,785	2,138,570
30	Rubber Products	875	236,442	1,609,586
31	Leather and Leather Products	5,308	386,723	1,498,811
32	Stone, Clay and Glass Products	11,650	485,337	3,138,263
33.	**Primary Metal Industries**	**5,363**	**1,127,674**	**7,950,990**
34.	**Fabricated Metal Products**	**16,734**	**980,723**	**6,210,759**
35.	**Machinery (except Electrical)**	**17,906**	**1,363,866**	**8,734,652**
36.	**Electrical Machinery**	**3,973**	**759,873**	**4,793,948**
37.	**Transportation Equipment**	**3,711**	**1,216,387**	**8,546,828**
38.	**Instruments**	**2,599**	**230,451**	**1,418,291**
	Total Metalworking Industry	**50,286**	**5,678,974**	**37,685,468**
39	Miscellaneous Manufactures	14,131	476,897	2,501,432

† Based on 1947 Census of Manufactures
* Based on 1950 Annual Survey of Manufactures

World Production

METALWORKING FACTS AND FIGURES

By Countries—Net Tons

STEEL INGOT AND CASTINGS OUTPUT

	1952a	1951	1950	1949	1948	1947	1946	1945
World Total	239,458,000	239,773,148	207,303,445	177,463,076	168,764,990	147,200,111	120,881,060	120,583,828
United States	93,093,000	105,199,848	96,836,075	77,978,176	88,640,470	84,894,071	66,602,724	79,701,648
Canada	3,800,000	3,561,600	3,383,520	3,190,430	3,198,720	2,945,936	2,334,640	2,877,952
Great Britain	17,900,000	17,515,120	18,247,825	17,419,250	16,661,800	14,250,880	14,218,736	13,244,000
France (b)	12,000,000	10,818,500	9,517,200	10,672,200	7,959,600	6,317,766	4,858,000	1,831,200
Saar	3,130,000	2,863,300	2,087,800	1,932,700	1,350,800	780,216	—Included in Germany—	
Belgium	5,450,000	5,600,100	4,167,900	4,252,600	4,308,700	3,179,270	2,517,200	812,000
Luxemburg	3,300,000	3,384,700	2,696,100	2,499,200	2,698,300	1,887,726	1,426,096	291,200
Italy	3,850,000	3,307,700	2,555,300	2,260,500	2,337,500	1,874,502	1,270,640	436,800
Spain	960,000	893,200	899,800	791,560	631,680	596,182	660,800	616,000
Sweden	1,750,000	1,677,500	1,604,900	1,530,100	1,382,700	1,312,482	1,324,624	1,316,000
Germany (c)	19,700,000	16,563,800	14,427,600	11,611,600	6,482,300	3,490,034	3,318,448	1,705,984
Austria	1,200,000	1,130,800	1,037,300	918,060	712,800	394,516	206,080	189,504
The Netherlands	700,000	608,300	539,000	470,470	380,800	....	....	....
Czechoslovakia	3,850,000	3,643,200	3,312,100	3,038,200	2,915,000	2,519,172	1,842,624	1,047,200
Poland	3,575,000	3,071,200	2,766,500	2,533,300	2,150,000	1,740,058	1,344,000	545,552
Hungary	1,560,000	1,357,400	1,124,200	933,900	820,000	662,302	392,000	141,904
Rumania	795,000	710,600	613,800	504,900	373,000	....	....	....
Yugoslavia	490,000	473,000	470,800	438,900	400,000	....	....	....
Russia	38,000,000	34,430,000	30,030,000	25,600,000	18,150,000	14,300,000	13,440,000	10,080,000
Japan (d)	7,800,000	7,146,700	5,322,900	3,549,700	1,900,000	1,070,042	700,000	1,173,700
India	1,730,000	1,674,200	1,610,335	1,515,360	1,344,000	1,389,732	1,457,120	1,515,136
Australia	1,725,000	1,601,600	1,395,185	1,341,650	1,424,640	1,511,328	1,124,144	1,573,600
South Africa	1,310,000	1,107,700	832,385	804,100	766,080	658,896	555,184	588,448
Brazil	910,000	910,800	867,460	676,610	531,300	426,900	378,015	226,530
Mexico	680,000	497,280	240,460	379,610	294,800	353,100	276,100	211,200
Miscellaneous	1,200,000	1,025,000	717,000	620,000	950,000	645,000	633,885	458,270

(a) Estimated

(b) Includes Alsace-Lorraine from 1945.

(c) Includes Soviet Zone, but without Saar since 1947.

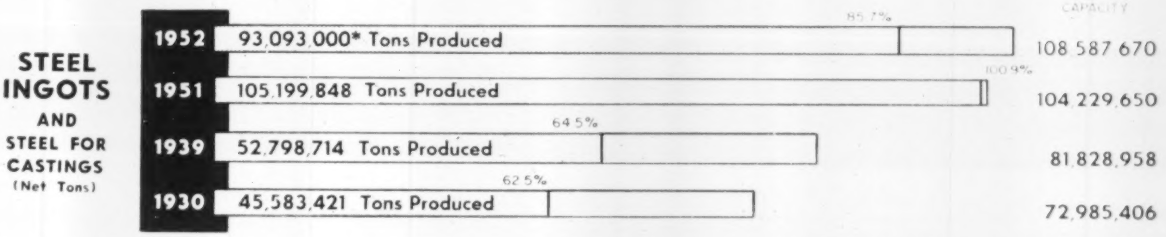
(d) Including Korea and Manchuria until July, 1945.

PIG IRON AND FERROALLOYS OUTPUT

	1952a	1951	1950	1949	1948	1947	1946	1945
World Total	162,897,000	161,803,580	144,913,660	127,437,775	124,250,549	107,664,844	84,910,946	85,219,845
United States	62,107,000	71,232,760	65,484,170	54,916,785	61,911,559	60,117,319	46,199,826	54,919,029
Canada	2,710,000	2,732,800	2,497,600	2,356,480	2,365,440	2,190,048	1,520,736	1,956,080
Great Britain	11,760,000	10,829,050	10,788,850	10,638,320	10,389,570	8,719,200	8,692,544	7,960,288
France (b)	10,745,000	9,618,400	8,537,100	9,179,500	7,214,900	5,384,372	3,857,280	1,303,680
Saar	2,800,000	2,607,000	1,850,200	1,740,200	1,247,400	719,606	—Included in Germany—	
Belgium	5,000,000	5,335,000	4,064,500	4,123,900	4,337,300	3,107,640	2,392,656	803,040
Luxemburg	3,350,000	3,472,700	2,748,900	2,609,200	2,886,400	2,003,436	1,504,384	350,560
Italy	1,400,000	1,002,650	482,790	448,800	578,600	425,372	192,864	87,360
Spain	840,000	732,600	733,700	676,000	581,500	554,306	540,960	516,320
Sweden	1,050,000	936,100	931,150	945,670	858,480	800,052	750,400	862,400
Germany (c)	15,000,000	12,141,800	10,791,000	8,404,000	5,350,000	2,640,392	2,707,824	1,237,606
Austria	1,300,000	1,154,340	971,410	921,470	688,200	306,356	63,840	110,208
The Netherlands	585,000	576,180	499,620	477,400	486,200	....	....	....
Czechoslovakia	2,585,000	2,370,500	2,257,200	2,071,000	1,850,000	1,568,146	1,058,400	635,040
Poland	2,035,000	1,734,700	1,636,800	1,367,000	1,210,000	957,638	800,800	268,800
Hungary	715,000	556,600	550,000	473,000	445,000	339,416	175,840	48,160
Russia	27,500,000	24,310,000	21,340,000	18,500,000	15,400,000	12,500,000	10,080,000	8,400,000
Japan (d)	3,900,000	3,520,000	2,528,680	1,740,480	914,100	409,940	203,840	1,400,000
India	2,050,000	2,029,500	1,880,370	1,804,320	1,639,700	1,553,269	1,584,912	1,554,000
Australia	1,600,000	1,491,600	1,229,870	1,170,400	1,383,900	1,280,384	978,656	1,298,640
South Africa	1,175,000	885,500	807,850	780,980	705,100	707,952	597,184	612,640
Brazil	790,000	833,800	801,900	562,870	607,200	426,827	378,015	226,530
Miscellaneous	1,900,000	1,700,000	1,500,000	1,530,000	1,200,000	953,173	629,985	669,470

Production-Capacity

METALWORKING FACTS AND FIGURES



ANNUAL STEEL CAPACITY AND PRODUCTION BY PROCESSES

	Open-hearth		Bessemer		Crucible		Electric		TOTAL		Per Cent
	Capacity	Production	Capacity	Production	Capacity	Production	Capacity	Production	Capacity†	Production	Capacity
1952.....	94,973,780	....	5,381,000	....	40	‡	8,232,850	....	108,587,670	93,093,000	85.7*
1951.....	91,054,020	93,166,518	5,621,000	4,890,946	20	‡	7,554,610	7,142,384	104,229,650	105,199,848	100.9
1950.....	86,984,490	86,262,509	5,537,000	4,534,558	20	‡	6,871,290	6,039,008	99,392,800	96,836,075	96.9 #
1949.....	84,817,040	70,248,803	5,191,000	3,946,656	20	‡	6,112,870	3,782,717	96,120,930	77,978,176	81.1
1948.....	83,610,690	79,340,157	5,226,000	4,243,172	20	‡	5,396,750	5,057,141	94,233,460	88,640,470	94.1
1947.....	81,010,990	76,873,793	5,154,000	4,232,543	20	‡	5,076,240	3,787,735	91,241,250	84,894,071	93.0
1946.....	81,236,250	60,711,963	5,154,000	3,327,737	20	‡	5,500,290	2,563,024	91,890,560	66,602,724	72.5
1945.....	84,171,590	71,939,602	5,874,000	4,305,318	3,800	24	5,455,890	3,456,704	95,505,280	79,701,648	83.5
1944.....	82,223,610	80,363,953	6,074,000	5,039,923	3,800	25	5,350,880	4,237,699	93,652,290	89,641,600	95.5
1943.....	79,180,880	78,621,804	6,553,000	5,625,492	3,800	146	4,554,980	4,589,070	90,292,660	88,836,512	98.1
1942.....	78,107,260	76,501,957	6,721,400	5,553,424	3,800	2,010	3,737,510	3,974,540	88,569,970	86,031,931	96.8
1941.....	74,565,510	74,389,619	6,996,520	5,578,071	3,942	2,313	2,586,320	2,869,256	84,152,292	82,839,259	97.3
1940.....	73,721,592	61,573,083	6,009,920	3,708,573	5,354	1,024	1,882,630	1,700,006	81,619,496	66,982,686	82.1
1939.....	72,959,638	48,409,800	7,138,880	3,358,916	5,354	931	1,725,086	1,029,067	81,828,958	52,798,714	64.5
1938.....	71,472,370	29,080,016	7,212,800	2,106,340	9,610	7	1,490,858	565,627	80,185,638	31,751,990	39.6
1937.....	69,725,736	51,824,979	7,084,000	3,863,918	11,850	1,046	1,326,788	947,002	78,148,374	56,636,945	72.5
1936.....	68,946,829	48,760,463	8,058,400	3,873,472	11,850	914	1,147,221	865,150	78,164,300	53,499,999	68.4
1935.....	68,544,310	34,401,280	8,842,400	3,175,235	11,850	719	1,053,370	606,471	78,451,930	38,183,705	48.7
1934.....	68,222,445	26,354,838	8,842,400	2,421,840	18,704	595	1,044,867	404,651	78,128,416	29,181,924	37.4
1933.....	68,241,286	22,827,473	8,872,668	2,720,246	23,684	763	1,476,765	471,747	78,614,403	26,020,229	33.1
1932.....	68,176,102	13,336,210	9,072,420	1,715,925	24,725	722	1,507,666	270,044	78,780,913	15,322,901	19.5

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* Estimated by STEEL. ‡ Included with electric steel. † As of Jan. 1. # Based on average annual capacity of 99,982,650 tons. American Iron & Steel Institute.

MONTHLY OUTPUT OF STEEL FOR INGOTS AND CASTINGS

	Open-hearth		Bessemer		Electric		Total		Calculated	No.
	Net Tons	% Capac.	Net Tons	% Capac.	Net Tons	% Capac.	Net Tons	% Capac.	Net Tons Weekly	weeks in mo.
1952 ..	....	....	....	...	....	...	....	...	....	...
Jan. ..	8,103,123	100.7	407,298	89.3	625,696	89.7	9,136,117	99.3	2,062,329	4.43
Feb. ..	7,703,066	102.4	382,712	89.8	571,432	87.6	8,657,210	100.7	2,091,114	4.14
Mar. ..	8,401,140	104.4	378,861	83.1	624,190	89.5	9,404,191	102.2	2,122,842	4.43
Apr. ..	7,101,199	91.1	323,006	73.2	566,937	83.9	7,991,142	89.7	1,862,737	4.29
May ..	7,291,865	90.6	318,642	69.9	594,089	85.2	8,204,596	89.2	1,852,053	4.43
June ..	1,446,927	18.6	22,862	5.2	169,702	25.1	1,639,491	18.4	382,166	4.29
July ..	1,347,587	16.8	2,000	0.4	277,371	39.8	1,626,958	17.7	368,090	4.42
Aug. ..	7,599,888	94.4	309,361	67.8	589,438	84.5	8,498,687	92.4	1,918,440	4.43
Sept. ..	8,039,128	103.4	351,620	79.8	671,357	99.6	9,062,105	101.9	2,117,314	4.28
Oct. ..	8,741,000	108.6	347,000	76.1	702,000	100.6	9,790,000	106.4	2,210,000	4.43
1951 ..	93,166,518	102.3	4,890,946	87.0	7,142,384	94.5	105,199,848	100.9	2,017,642	52.14
Jan. ..	7,846,657	101.4	431,725	90.4	570,084	88.8	8,848,466	99.9	1,997,396	4.43
Feb. ..	6,936,993	99.3	326,112	75.6	507,302	87.5	7,770,407	97.2	1,942,602	4.00
Mar. ..	8,061,346	104.2	408,926	85.6	606,358	94.5	9,076,630	102.5	2,048,901	4.43
Apr. ..	7,858,839	104.9	392,472	84.9	594,668	95.7	8,845,979	103.1	2,062,000	4.29
May ..	8,072,994	104.4	408,650	85.6	618,511	96.4	9,100,155	102.8	2,054,211	4.43
June ..	7,669,449	102.4	403,001	87.1	589,898	94.9	8,662,348	101.0	2,019,195	4.29
July ..	7,706,078	99.8	411,599	86.4	566,818	88.5	8,684,495	98.3	1,964,818	4.42
Aug. ..	7,694,965	99.5	436,822	91.5	607,308	94.6	8,739,095	98.7	1,972,708	4.43
Sept. ..	7,653,801	102.4	404,726	87.7	601,830	97.0	8,660,357	101.2	2,023,448	4.28
Oct. ..	8,028,721	103.8	458,128	95.9	635,037	98.9	9,121,886	103.0	2,059,116	4.43
Nov. ..	7,750,845	103.5	411,954	89.1	636,553	102.4	8,799,352	102.6	2,051,131	4.29
Dec. ..	7,885,830	102.2	396,831	83.3	608,017	94.9	8,890,678	100.6	2,011,466	4.42

American Iron & Steel Institute

PIG IRON†

CAPACITY and PRODUCTION

Net Tons

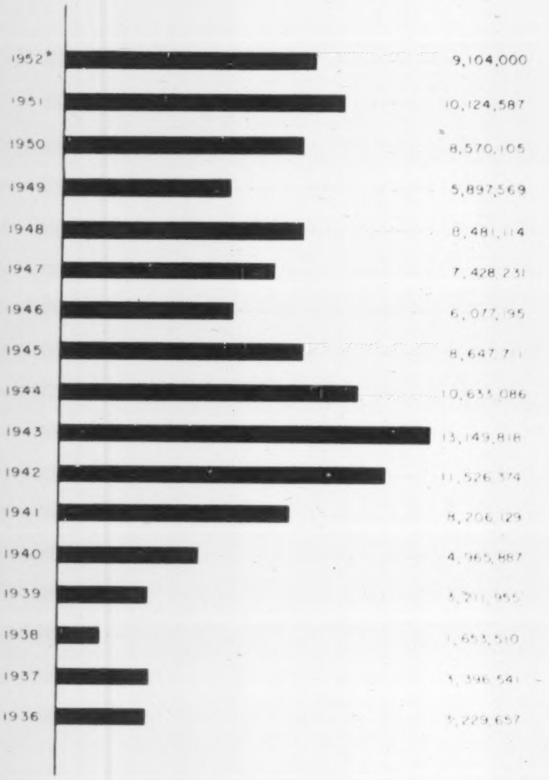
	Capacity	Production	%
1952	73,782,340	62,107,000*	84.2*
January		6,039,591	96.6
February		5,781,602	99.0
March		6,300,006	100.8
April		5,224,854	86.3
May		5,491,708	87.8
June		1,068,281	17.6
July		1,002,512	16.1
August		5,830,757	93.3
September		6,161,365	102.1
October		6,515,091	104.2
November			..
December			
1951	72,471,780	71,227,756	98.3
1950	71,560,110	65,439,769	91.4
1949	70,541,850	54,175,534	76.8
1948	67,438,930	61,043,806	90.5
1947	65,709,200	59,311,348	90.3
1946	67,340,590	45,547,907	67.6
1945	67,313,890	54,166,482	80.5
1944	67,921,410	62,072,683	91.4
1943	64,188,220	61,920,314	96.5
1942	60,606,850	60,115,387	99.2
1941	57,774,640	56,070,506	97.1
1940	55,723,640	46,979,091	84.3
1939	56,325,830	35,296,478	62.8
1938	56,782,208	21,182,569	37.3
1937	55,557,305	41,171,187	74.1

* Estimated by STEEL. † Including ferro-alloys made in blast furnaces.
American Iron & Steel Institute

Ferrous Production

ALLOY STEEL PRODUCTION

Total Ingots and Castings—Net Tons



ALLOY STEEL PRODUCTION BY PROCESSES

Ingots and Castings—Net Tons

	Open-hearth					
	Basic	Acid	Total	Bessemer	Crucible	Electric
1952‡	....	....	4,770,004	....	†	2,466,806
1951	6,585,635	238,034	6,823,669	....	†	3,300,918
1950	5,738,067	123,253	5,861,320	....	†	2,708,785
1949	4,192,344	105,550	4,297,894	....	†	1,599,675
1948	6,285,054	128,915	6,413,969	....	†	2,067,145
1947	5,520,540	128,754	5,649,294	....	†	1,778,937
1946	4,325,657	115,711	4,441,368	....	†	1,635,827
1945	5,572,353	274,889	5,847,242	....	18	2,800,451
1944	6,494,627	515,662	7,010,289	....	23	3,622,774
1943	8,539,523	677,416	9,216,939	....	136	3,932,743
1942	7,524,209	608,867	8,133,076	....	522	3,392,776
1941	5,306,415	433,240	5,739,655	3,890	933	2,461,651
1940	3,421,961	252,965	3,674,926	3,990	255	1,286,716
1939	2,392,273	156,581	2,458,854	3,486	231	749,384
1938	1,179,031	102,089	1,281,120	13	5	372,372
1937	2,559,200	164,455	2,723,655	....	270	672,616
1936	2,508,671	129,658	2,638,329	....	234	591,094
1935	1,829,566	82,208	1,911,774	....	172	462,071

‡ First ten months.
† Included with electric steel.
American Iron & Steel Institute

* Estimated

Stainless Steel Production

Net Tons of Ingots

Type Number	9 mos., 1952	12 mos., 1951	Type Number	9 mos., 1952	12 mos., 1951
301	7,169	20,794	414	1,371	3,201
302	48,232	99,734	416	24,510	36,046
302B	225	137	420	3,551	5,605
303	21,202	24,318	430	188,552	360,874
304	87,819	108,108	430F	1,935	2,020
308	9,854	6,950	431	3,315	4,191
309	4,416	4,586	440A	1,125	1,155
310	12,598	12,330	440B	1,160	823
316	28,837	36,222	440C	2,173	3,839
321	46,011	57,513	442	1,238	944
347	8,437	18,771	443	176	9
403	18,867	18,008	446	1,881	4,584
405	2,586	3,984	All Other	52,487	48,661
406	1,401	3,575			
410	27,413	46,748	Total	608,541	933,730

American Iron & Steel Institute

High Speed and Tool Steel Bars

(Excluding Hollow Drill Steel)
Shipments—Net Tons

CLASS A HIGH SPEED STEEL

Grade	C (Min.)	Cr —(Maximum)—	W	Mo	V	Co (Min.)	9 mos. 1952	12 mos. 1951
I	0.60	4.5	6.75	5.5	2.1 Max.	..	9,222	19,398
I-b	0.90	4.5	6.75	6.5	2.25 Min.	..	409	557
I-c	0.60	4.5	6.75	5.5	2.2 Max.	3.5	202	239
II	0.60	4.5	2.0	9.25	1.3 Max.	..	3,141	7,504
II-c	0.60	4.5	2.0	9.25	2.2 Max.	3.5	175	270
III	0.60	4.5	...	9.25	2.2 Max.	..	2,109	2,421
III-c	0.60	4.5	...	9.25	2.2 Max.	3.5	19	178
Total							15,277	30,567

CLASS B HIGH SPEED STEEL

Grade	C (Min.)	Cr	W	Mo	V	Co (Min.)	9 mos. 1952	12 mos. 1951
IV	0.55	4.5	19.0	...	1.3 Max.	..	1,184	6,061
IV-b	0.55	4.5	19.0	1.25	1.75 Min.	..	152	499
IV-c	0.55	4.5	22.0	1.25	2.2 Max.	3.5	536	929
Total							1,872	7,489

OTHER TOOL STEELS

		9 mos. 1952	12 mos. 1951
V	All hot-work steel	9,381	12,995
VI	High chromium (4% Cr minimum) die steels	7,424	12,230
VII	All other alloy tool steels	43,646	78,621
VIII	Carbon tool steels, excluding hollow drill steel	15,453	34,112
Total		75,904	137,958
Grand Total		93,053	176,014

American Iron & Steel Institute

Steel Forgings

Shipments for Sale—Net Tons

1952	Drop and Upset	Press and Open Hammer	Total
Jan.	129,761	61,013	190,774
Feb.	125,042	62,445	187,487
Mar.	127,768	48,673	176,441
Apr.	125,736	42,550	168,286
May	114,271	41,569	155,840
June	101,861	33,537	135,398
July	69,165	27,663	96,828
Aug.	78,837	39,196	118,033
Sept.	......	......	......
Oct.	......	......	......
Nov.	......	......	......
Dec.	......	......	......
1951†	1,319,152	550,875	1,870,027
Jan.	108,842	29,571	138,413
Feb.	97,448	31,351	128,799
Mar.	118,039	42,878	160,917
Apr.	112,074	41,873	153,947
May	117,475	49,484	166,959
June	110,979	49,595	160,574
July	94,783	38,744	133,527
Aug.	103,450	40,857	144,307
Sept.	97,326	52,410	149,736
Oct.	130,675	60,808	191,483
Nov.	119,047	57,295	176,342
Dec.	109,014	56,009	165,023
1950	1,089,515	270,638	1,360,153
1949	866,444	272,184	1,138,628
1948	1,028,712	385,977	1,414,689
1947	972,082	361,649	1,333,731

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† Beginning with May, 1951, the Bureau of the Census broadened its coverage of forgings production.
U. S. Bureau of the Census

Distribution

METALWORKING FACTS AND FIGURES

FINISHED STEEL DISTRIBUTION

By Market Classifications

(All Grades, Net Tons)

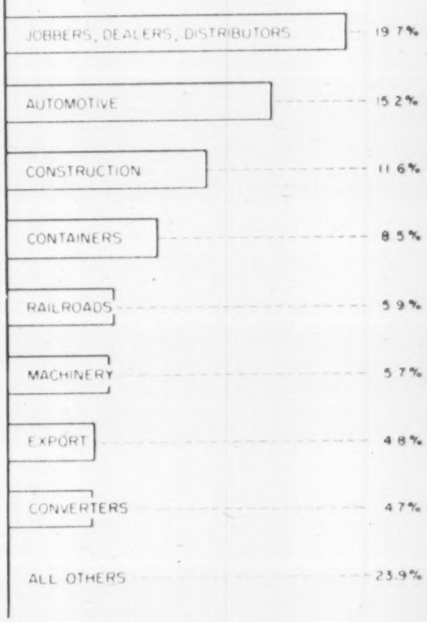
	12 mos. 1952*	12 mos. 1951	12 mos. 1950	12 mos. 1949
Jobbers, Dealers, Distributors	13,515,958	14,399,432	13,359,724	10,219,983
Automotive	10,421,119	12,982,356	14,472,707	10,962,894
Construction, including Maintenance	7,921,967	9,583,500	8,602,083	7,477,953
Containers	5,813,095	6,523,954	5,911,164	4,655,635
Rail Transportation	4,032,877	5,781,589	4,299,346	3,655,406
Machinery, Indus. Equip. & Tools	3,882,243	4,245,167	3,473,896	2,708,633
Export	3,320,790	2,764,411	2,566,473	3,517,971
Converters and Processors	3,190,697	4,186,151	3,899,786	2,504,168
Contractors' Products	2,663,479	3,080,273	3,075,195	2,124,806
Ordnance, Other Military	2,040,403	1,200,211	194,614	81,150
Electrical Machinery and Equip.	1,609,043	2,021,123	1,836,632	1,209,027
Other Domestic & Commercial Equip.	1,567,961	2,030,669	1,804,449	1,325,940
Forgings (other than Automotive)	1,403,633	1,550,151	1,082,309	821,570
Agricultural	1,396,786	1,638,456	1,537,708	1,491,085
Appliances	1,328,316	1,836,807	2,087,853	1,322,922
Bolts, Nuts, Rivets, Screws	1,314,622	1,598,735	1,410,011	874,594
Shipbuilding, Marine Equipment	944,885	884,210	327,413	668,694
Unclassified	869,568	1,261,575	1,329,648	1,568,406
Oil & Gas Drilling	760,016	834,632	620,413	600,205
Mining, Quarrying, Lumbering	342,349	374,769	289,302	271,872
Aircraft	130,093	150,779	51,566	41,096
Total	68,469,900	78,928,950	72,232,292	58,104,010

American Iron & Steel Institute

* Estimated by STEEL on basis of actual shipments in first 9 months.

WHERE THE STEEL GOES

1952 — ESTIMATED



DISTRIBUTION

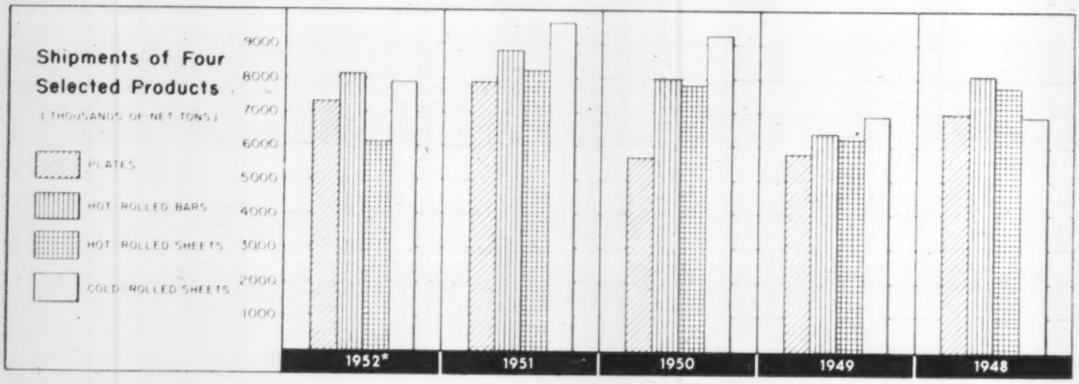
NET TONS

By Market Classifications

	STAINLESS STEEL			ALLOY STEEL (Other than Stainless)			CARBON STEEL		
	6 mos. 1952	12 mos. 1951	12 mos. 1950	6 mos. 1952	12 mos. 1951	12 mos. 1950	6 mos. 1952	12 mos. 1951	12 mos. 1950
Converters and Processors	17,769	45,012	40,294	54,255	87,141	67,928	1,404,406	4,053,998	3,791,564
Forgings (Other than Automotive)	8,246	15,240	9,290	324,533	706,476	419,663	336,222	828,435	653,356
Bolts, Nuts, Rivets, Screws	2,905	6,594	4,272	43,538	105,111	78,304	597,913	1,487,030	1,327,435
Jobbers, Dealers, Distributors	60,699	126,384	108,320	206,847	415,632	330,157	6,168,366	13,857,416	12,921,247
Construction, including Maintenance	3,943	10,944	5,310	43,233	100,515	88,842	3,891,275	9,472,041	8,507,931
Contractors' Products	3,925	13,392	11,421	16,636	31,905	40,996	1,295,832	3,034,976	3,022,778
Automotive	22,991	85,346	81,800	672,098	1,873,538	1,901,472	4,078,352	11,623,472	12,489,435
Rail Transportation	802	4,307	3,824	76,837	220,827	166,493	1,971,514	5,556,455	4,129,029
Shipbuilding, Marine Equip.	1,346	1,640	1,167	19,891	28,782	18,357	404,536	853,788	307,893
Aircraft	16,382	33,583	11,942	30,879	61,171	27,732	17,022	56,025	11,857
Oil and Gas Drilling	1,443	1,460	880	83,742	157,271	140,369	274,209	675,901	479,195
Mining, Quarrying, Lumbering	317	680	401	13,275	27,118	18,297	157,163	346,971	270,604
Agricultural	88	339	277	17,457	49,474	50,531	656,855	1,588,643	1,486,900
Machinery, Indus. Equip. & Tools	21,616	47,546	27,240	297,902	680,145	528,078	1,622,812	3,517,476	2,918,578
Electrical Machinery and Equip.	7,392	17,742	17,906	209,218	531,791	498,011	587,560	1,471,590	1,320,715
Appliances, Utensils, Cutlery	14,585	46,156	45,747	10,679	35,782	43,942	635,229	1,754,869	1,998,164
Other Domestic & Commercial Equip.	5,073	14,771	10,271	13,124	26,421	24,571	746,500	1,989,477	1,769,607
Containers	264	2,406	4,516	13,539	20,488	16,906	2,683,947	6,501,060	5,889,742
Ordnance, Other Military	7,218	8,790	1,909	147,015	252,282	41,534	805,291	939,139	151,171
Unclassified	32,161	47,124	50,701	90,000	208,023	135,901	359,739	1,006,428	1,143,046
Export	8,202	10,054	11,892	72,037	106,050	87,248	1,579,750	2,648,307	2,467,333
Total	237,397	539,510	449,380	2,456,735	5,725,943	4,725,332	30,274,493	72,663,497	67,057,580

American Iron & Steel Institute

SHIPMENTS OF STEEL PRODUCTS



Steel Products—Net tons	1952* Shipments	%	1951 Shipments	%	1950 Shipments	%	1949 Shipments	%	1948 Shipments	%
Ingots	1,040,742	1.52	1,315,846	1.7	888,324	1.2	2,261,285	3.9	3,150,754	4.8
Blooms, slabs, billets, tube rounds, sheet bars, etc.	2,293,742	3.35	2,239,747	2.8	2,233,832	3.1				
Skelp	102,705	0.15	152,474	0.2	123,388	0.2	118,533	0.2	75,252	0.1
Wire rods	718,934	1.05	847,369	1.1	816,555	1.1	570,397	1.0	610,348	0.9
Structural shapes (heavy)	4,190,358	6.12	4,921,970	6.2	4,197,653	5.8	3,669,503	6.3	4,255,355	6.5
Steel piling	232,798	0.34	399,073	0.5	342,277	0.5	301,824	0.5	299,537	0.5
Plates	7,312,585	10.68	7,910,594	10.0	5,677,094	7.9	5,759,065	9.9	7,000,199	10.6
Rails—Standard (over 60 lb)	1,335,163	1.95	1,699,042	2.2	1,705,243	2.4	1,772,734	3.0	1;976,520	3.0
Rails—All other	116,399	0.17	120,715	0.2	116,389	0.2	117,154	0.2	214,880	0.3
Joint bars	116,399	0.17	132,173	0.2	113,676	0.2	118,559	0.2	137,139	0.2
Tie plates	383,431	0.56	445,932	0.6	416,258	0.6	373,337	0.6	489,434	0.8
Track spikes	102,705	0.15	158,406	0.2	138,732	0.2	95,345	0.2	145,830	0.2
Wheels (rolled or forged)	349,196	0.51	396,561	0.5	268,662	0.4	285,733	0.5	337,376	0.5
Axles	164,328	0.24	221,097	0.3	130,601	0.2	159,628	0.3	215,905	0.3
Bars—Hot-rolled (including light shapes)	8,072,601	11.79	8,930,633	11.3	8,017,465	11.1	6,416,102	11.0	8,123,753	12.3
Bars—Reinforcing	1,814,452	2.65	1,900,125	2.4	1,674,079	2.3	1,572,588	2.7	1,541,966	2.3
Bars—Cold-finished	1,937,698	2.83	1,935,823	2.5	1,624,845	2.2	1,213,052	2.1	1,593,967	2.4
Tool steel	136,940	0.20	171,056	0.2	89,863	0.1	57,395	0.1	88,376	0.1
Standard pipe	2,430,681	3.55	2,933,321	3.7	2,599,818	3.6	2,090,445	3.6	6,881,549	10.4
Oil country goods	1,615,890	2.36	1,879,216	2.4	1,692,821	2.3	1,365,982	2.3		
Line pipe	2,951,053	4.31	3,186,838	4.0	3,668,511	5.1	2,534,423	4.4		
Mechanical tubing	958,579	1.40	980,066	1.2	743,892	1.0	944,370	1.7		
Pressure tubing	417,666	0.61	332,430	0.4	248,798	0.3				
Wire—Drawn	2,629,244	3.84	3,219,829	4.1	2,867,476	4.0	2,138,878	3.7	2,673,276	4.1
Wire—Nails and staples	691,546	1.01	864,833	1.1	874,470	1.2	731,356	1.3	859,540	1.3
Wire—Barbed and twisted	246,492	0.36	237,805	0.3	237,604	0.3	215,047	0.4	254,629	0.4
Wire—Woven wire fence	369,737	0.54	416,704	9.5	483,920	0.7	358,162	0.6	399,457	0.6
Wire—Bale ties	75,317	0.11	110,407	0.1	83,831	0.1	42,828	0.1	113,892	0.2
Black plate	924,344	1.35	1,076,296	1.4	562,077	0.8	452,041	0.8	838,666	1.3
Tin and terne plate—Hot dipped	1,403,633	2.05	1,628,562	2.1	1,911,568	2.7	1,699,355	2.9	2,167,912	3.3
Tin plate—Electrolytic	2,923,665	4.27	2,887,129	3.7	2,840,599	3.9	1,993,468	3.4	1,784,288	2.7
Sheets—Hot-rolled	6,100,668	8.91	8,170,733	10.3	7,804,948	10.8	6,192,610	10.7	7,786,056	11.8
Sheets—Cold-rolled	7,894,579	11.53	9,640,960	12.2	9,338,312	12.9	6,886,946	11.8	6,867,775	10.4
Sheets—Galvanized	1,937,698	2.83	1,984,961	2.5	2,262,041	3.1	1,755,067	3.0	1,643,337	2.5
Sheets—All other coated	219,104	0.32	257,195	0.3	237,941	0.3	151,118	0.3	....	...
Sheets—Enameling	150,634	0.22	182,187	0.2	256,766	0.4	162,815	0.3	....	...
Electrical sheets and strip	595,688	0.87	757,861	1.0	716,592	1.0	379,180†	0.6	....	...
Strip—Hot-rolled	1,800,758	2.63	2,206,978	2.8	2,330,783	3.2	1,674,818	2.9	1,662,787	2.5
Strip—Cold-rolled	1,711,748	2.50	2,076,003	2.6	1,894,588	2.6	1,465,297	2.5	1,783,383	2.7
All other	....	...	....	...	....	...	7,570	0.0	....	...
Total steel products	68,469,900	100.00	78,928,950	100.0	72,232,292	100.0	58,104,010	100.0	65,973,138	100.0

1952 SHIPMENTS OF FINISHED STEEL BY TYPES

(Net Tons)

	Carbon	Alloy	Stainless	Total
Jan.	6,035,931	510,393	46,916	6,593,240
Feb.	5,849,435	472,645	43,107	6,365,187
Mar.	6,362,675	481,632	46,084	6,890,391
Apr.	5,443,401	438,281	40,491	5,922,173
May	5,456,429	443,115	47,847	5,947,391
June	1,126,622	110,669	12,952	1,250,243
July	1,287,351	111,116	15,205	1,413,672
Aug.	5,831,748	443,385	36,985	6,312,118
Sept.	6,000,112	492,508	49,527	6,542,147
9 Mos.	43,393,704	3,503,744	339,114	47,236,562

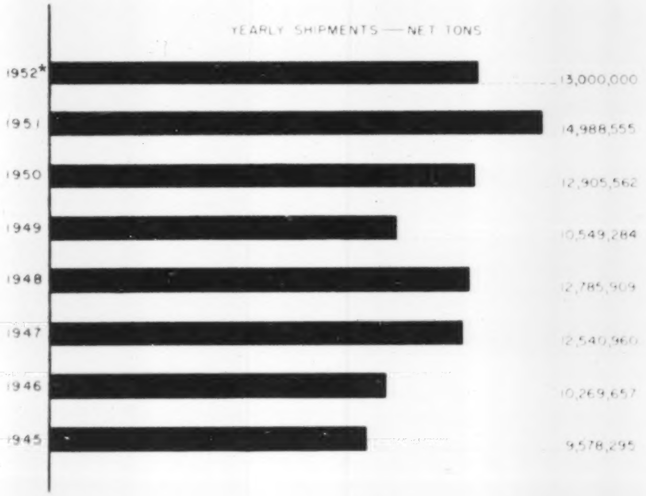
American Iron & Steel Institute

† Electrical sheets only

* Estimated

METALWORKING FACTS AND FIGURES

GRAY IRON CASTINGS



Shipments—Net Tons

	Miscellaneous	Ingot Molds	Chilled Iron Railroad Car Wheels	Cast Iron Pressure Pipe & Fittings	Cast Iron Soil Pipe & Fittings	For Sale	For Own Use
1952							
Jan.	745,548	225,704	57,155	125,729	45,149	694,498	504,787
Feb.	733,067	219,251	50,444	107,669	44,712	654,833	500,310
Mar.	723,225	228,799	53,919	115,843	50,231	660,920	511,097
Apr.	773,538	204,805	48,506	117,929	60,023	652,962	551,839
May	698,332	186,998	44,229	117,586	53,485	620,049	480,581
June	616,895	19,467	44,066	103,335	51,500	502,322	332,941
July	427,475	14,794	40,783	96,784	56,305	431,889	204,252
Aug.	596,369	198,856	35,606	108,313	62,485	602,025	399,604
Sept.	676,732	230,219	39,912	107,847	64,663	625,680	493,693
Oct.	......	......	......	......	......	......	......
Nov.	......	......	......	......	......	......	......
Dec.	......	......	......	......	......	......	......
1951	9,573,347	2,614,517	639,996	1,473,192	687,503	8,453,048	6,535,507
Jan.	875,437	228,824	56,046	131,779	72,225	762,407	601,904
Feb.	811,724	193,648	49,423	117,141	62,290	684,928	549,298
Mar.	921,980	231,853	68,282	143,702	74,592	818,426	621,983
Apr.	880,565	217,970	61,993	134,302	68,395	766,919	596,306
May	898,328	225,129	65,721	139,854	67,619	796,468	600,183
June	847,024	216,620	58,620	121,851	64,872	742,794	566,193
July	653,656	200,764	40,792	88,217	45,383	568,126	460,686
Aug.	779,838	222,721	50,127	115,284	50,862	697,952	520,880
Sept.	704,657	204,856	45,467	111,893	47,916	625,511	489,278
Oct.	815,815	244,556	53,172	130,636	57,502	732,764	568,917
Nov.	737,971	222,665	48,759	129,766	44,672	674,139	509,694
Dec.	646,352	204,911	41,594	108,767	31,175	582,614	450,185
1950	8,117,748	2,308,661	514,074	1,203,762	761,317	6,880,352	6,025,210
Jan.	573,743	188,152	34,254	64,095	53,077	449,577	463,744
Feb.	551,060	169,605	33,417	63,363	46,744	416,594	447,595
Mar.	635,403	170,082	44,898	89,264	56,135	500,195	495,587
Apr.	621,368	182,420	42,768	82,774	51,796	483,862	497,264
May	684,632	195,021	46,219	104,529	64,710	572,887	522,224
June	713,811	197,474	45,672	106,980	72,192	613,084	523,045
July	595,918	177,154	35,066	94,438	58,874	507,867	453,583
Aug.	747,046	199,770	52,508	131,127	71,118	677,134	524,435
Sept.	722,667	203,191	44,707	121,556	67,119	648,966	510,274
Oct.	792,764	220,821	46,516	119,105	75,695	700,512	554,389
Nov.	733,570	194,271	44,382	115,465	73,082	656,745	504,025
Dec.	745,766	210,700	43,667	111,066	70,775	652,929	529,045
1951	9,573,347	2,614,517	639,996	1,473,192	687,503	8,453,048	6,535,507
1950	8,117,748	2,308,661	514,074	1,203,762	761,317	6,880,352	6,025,210
1949	6,624,420	1,776,242	555,569	1,029,743	563,310	5,517,527	5,031,757
1948	8,296,843	1,979,740	719,784	1,149,553	639,989	7,131,405	5,654,504
1947	8,305,793	1,873,376	752,976	1,031,626	577,189	7,181,299	5,359,661
1946	6,952,462	1,397,776	723,891	786,314	409,214	6,102,246	4,167,411
1945	6,062,476	1,810,562	899,561	602,663	203,033	5,923,201	3,655,094

U. S. Bureau of the Census

DIE CASTINGS

Shipments—Thousands of Pounds

Copper and Copper-Base

	1952	1951	1950
Jan.	875	1,240	1,146
Feb.	758	1,265	1,029
Mar.	675	1,394	1,266
Apr.	784	1,097	1,104
May	646	1,164	1,190
June	748	1,347	1,311
July	574	1,044	1,108
Aug.	660	1,268	1,316
Sept.	....	1,079	1,256
Oct.	....	945	1,440
Nov.	....	719	1,540
Dec.	....	600	1,393
Total	....	13,132	15,099

YEARLY TOTALS

1951	13,132	1948	13,642
1950	15,099	1947	13,138
1949	9,499	1946	10,651

Aluminum and Aluminum-Base

	1952	1951	1950
Jan.	13,884	14,882	10,198
Feb.	13,012	15,114	10,025
Mar.	12,880	15,087	12,445
Apr.	14,182	14,499	12,526
May	13,907	14,026	13,578
June	13,860	13,085	13,969
July	12,341	10,459	11,399
Aug.	12,884	11,767	14,011
Sept.	....	12,293	15,738
Oct.	....	13,049	18,054
Nov.	....	12,604	18,407
Dec.	....	10,891	16,851
Total	....	157,756	167,201

YEARLY TOTALS

1951	157,756	1948	128,903
1950	167,201	1947	115,611
1949	98,340	1946	73,702

Zinc and Zinc-Base

	1952	1951	1950
Jan.	37,873	44,632	36,856
Feb.	34,135	42,337	32,962
Mar.	34,962	48,060	42,614
Apr.	37,189	47,510	40,090
May	35,641	48,215	47,029
June	33,732	45,348	48,289
July	23,375	37,434	41,924
Aug.	29,822	40,831	46,589
Sept.		31,386	48,712
Oct.		36,483	50,583
Nov.		30,425	48,597
Dec.		29,704	47,618
Total		482,365	531,863

YEARLY TOTALS

1951	482,365	1948	457,088
1950	531,863	1947	438,693
1949	397,061	1946	375,815

Lead and Lead-Base

	1952	1951	1950
Jan.	3,604	2,059	1,287
Feb.	2,612	2,230	1,196
Mar.	2,692	3,133	1,515
Apr.	3,048	5,135	1,293
May	2,638	3,788	1,418
June	3,109	2,844	1,500
July	2,441	2,433	1,465
Aug.	2,777	2,777	2,384
Sept.	....	3,036	2,349
Oct.	....	2,846	2,461
Nov.	....	2,186	2,307
Dec.	....	2,409	1,802
Total	....	34,876	20,977

YEARLY TOTALS

1951	34,876	1948	22,887
1950	20,977	1947	18,165
1949	13,743	1946	13,667

U. S. Bureau of the Census

STEEL CASTINGS

Shipments—Net Tons

	Carbon	Alloy, Including Stainless	For Sale	For Own Use	Total
1952					
9 Mos.	1,036,833	413,223	1,118,983	331,073	1,450,056
Jan.	133,985	49,753	139,488	44,250	183,738
Feb.	125,484	49,142	133,602	41,024	174,626
Mar.	125,787	47,907	131,997	41,697	173,694
Apr.	126,628	48,447	134,325	40,750	175,075
May	125,309	48,326	132,129	41,506	173,635
June	101,850	39,778	114,410	27,218	141,628
July	81,576	37,460	97,633	21,403	119,036
Aug.	107,203	43,029	113,997	36,235	150,232
Sept.	109,011	49,381	121,402	36,990	158,392
Oct.	......	......	......	......	......
Nov.	......	......	......	......	......
Dec.	......	......	......	......	......
1951	1,541,480	508,574	1,506,903	543,151	2,050,054
Jan.	128,504	38,013	124,002	42,515	166,517
Feb.	120,949	36,090	117,156	39,883	157,039
Mar.	142,132	40,633	134,184	48,581	182,765
Apr.	134,706	41,101	129,059	46,748	175,807
May	135,645	44,543	130,826	49,362	180,188
June	136,399	41,464	131,219	46,644	177,863
July	106,684	33,633	100,141	40,176	140,317
Aug.	130,913	46,183	128,981	48,115	177,096
Sept.	120,632	40,063	116,658	44,037	160,695
Oct.	138,610	51,319	139,953	49,976	189,929
Nov.	126,544	50,184	131,276	45,452	176,728
Dec.	119,762	45,348	123,448	41,662	165,110
1950	1,129,588	350,999	1,084,784	395,803	1,480,587
Jan.	64,517	24,301	59,193	29,625	88,818
Feb.	67,511	24,901	63,703	28,709	92,412
Mar.	83,545	29,162	79,743	32,964	112,707
Apr.	80,146	27,816	77,680	30,282	107,962
May	89,738	29,575	87,245	32,068	119,313
June	102,159	31,397	99,076	34,480	133,556
July	74,147	24,911	71,313	27,745	99,058
Aug.	98,133	32,157	98,301	31,989	130,290
Sept.	104,789	31,612	100,770	35,631	136,401
Oct.	120,107	32,264	114,745	37,626	152,371
Nov.	118,030	30,940	113,481	35,489	148,970
Dec.	126,766	31,963	119,534	39,195	158,729
1949	962,601	297,369	n.a.	n.a.	1,259,970
1948	1,408,459	370,206	n.a.	n.a.	1,778,665
1947	1,259,492	373,224	n.a.	n.a.	1,632,716
1946	1,112,243	319,806	1,043,358	388,691	1,432,049

U. S. Bureau of the Census

MALLEABLE IRON CASTINGS

Shipments—Net Tons

	For Sale	For Own Use	Total
1952			
9 Mos.	423,357	257,922	681,279
Jan.	54,988	32,015	87,003
Feb.	50,129	32,769	82,898
Mar.	49,084	31,876	80,960
Apr.	56,337	32,933	89,270
May	51,476	30,294	81,770
June	46,511	27,935	74,446
July	29,675	15,591	45,266
Aug.	39,308	24,408	63,716
Sept.	45,849	30,101	75,950
Oct.	......	......	......
Nov.	......	......	......
Dec.	......	......	......
1951	656,076	429,165	1,085,241
Jan.	54,817	37,691	92,508
Feb.	54,915	34,035	88,950
Mar.	60,771	41,402	102,173
Apr.	58,199	39,722	97,921
May	61,918	39,427	101,345
June	57,176	37,200	94,376
July	45,072	31,754	76,826
Aug.	57,164	33,563	90,727
Sept.	48,568	33,708	82,276
Oct.	58,251	35,633	93,884
Nov.	53,682	34,528	88,210
Dec.	45,543	30,502	76,045
1950	536,945	405,279	942,224
Jan.	34,477	29,631	64,108
Feb.	32,733	28,839	61,572
Mar.	40,481	27,352	67,833
Apr.	38,014	33,239	71,253
May	44,469	33,442	77,911
June	48,859	35,449	84,308
July	38,995	30,094	69,089
Aug.	52,445	35,759	88,204
Sept.	49,210	35,333	84,543
Oct.	52,606	39,589	92,195
Nov.	51,054	36,311	87,365
Dec.	53,602	40,241	93,843
1949	373,313	349,585	722,898
1948	527,192	413,992	941,184
1947	514,195	384,605	898,800
1946	452,355	299,673	752,028
1945	520,887	269,844	790,731
1944	619,588	258,645	878,233
1943	653,884	190,755	844,639
1942	590,804	155,204	746,008
1941	619,365	212,808	832,173
1940	400,818	155,391	556,209
1939	331,421	134,647	466,068
1938	208,597	87,406	296,003
1937	420,937	175,685	596,622
1936	378,900	175,770	554,670

U. S. Bureau of the Census

HIGH ALLOY CASTINGS

Estimated Production by All United States Producers—Pounds

	Heat Resistant	Corrosion Resistant	Abrasion Resistant	Totals
1952	40,350,100†	26,748,600†	6,000,000†	73,098,700†
1st Qtr.	11,384,300	7,896,100	2,346,000	21,626,400
2nd Qtr.	9,779,000	6,982,400	1,542,000	18,303,400
3rd Qtr.	9,186,800	5,870,100	1,032,000	16,088,900
4th Qtr.	10,000,000†	6,000,000†	1,080,000†	17,080,000†
1951	38,277,000	28,771,600	6,132,300	73,180,900
1st Qtr.	8,233,300	7,351,600	1,827,425	17,412,325
2nd Qtr.	9,895,000	7,137,300	2,219,893	19,252,193
3rd Qtr.	9,309,100	7,052,300	1,024,094	17,385,494
4th Qtr.	10,839,600	7,230,400	1,060,888	19,130,888

Alloy Casting Institute

	Heat Resistant	Corrosion Resistant	Abrasion Resistant	Totals
1950	26,894,000	19,033,200	3,321,200	49,248,400
1949	19,791,700	12,997,100	1,500,700	34,289,500
1948	24,030,400	16,285,200	2,525,300	42,840,900
1947	21,505,100	16,346,900	1,534,500	39,386,500
1946	20,398,800	15,150,400	1,860,700	37,409,900
1945	23,002,700	12,276,200	1,482,000	36,760,900
1944	27,698,800	9,662,100	1,365,700	38,726,600
1943	33,245,400	10,726,900	2,116,900	46,089,200
1942	31,020,900	10,490,500	1,212,600	42,724,000
1941	21,713,900	9,679,600	1,511,500	32,905,000
1939	8,793,500	2,812,600	573,500	12,179,600

† Preliminary

NONFERROUS CASTINGS

Zinc and Zinc-Base Alloy Castings

Shipments—Thousands of Pounds

	Die	All Other	Total
1952			
8 Mos	266,729	1,021	267,750
Jan.	37,873	154	38,027
Feb.	34,135	172	34,307
Mar.	34,962	121	35,083
Apr.	37,189	123	37,312
May	35,641	134	35,775
June	33,732	97	33,829
July	23,375	87	23,462
Aug.	29,822	133	29,955
Sept.	.....	...	.....
Oct.	.....	...	.....
Nov.	.....	...	.....
Dec.	.....	...	.....
1951	482,365	2,343	484,708
Jan.	44,632	328	44,960
Feb.	42,337	225	42,562
Mar.	48,060	262	48,322
Apr.	47,510	188	47,698
May	48,215	302	48,517
June	45,348	189	45,537
July	37,434	130	37,564
Aug.	40,831	214	41,045
Sept.	31,386	121	31,507
Oct.	36,483	82	36,565
Nov.	30,425	106	30,531
Dec.	29,704	196	29,900
1950	531,863	4,535	536,398
Jan.	36,856	269	37,125
Feb.	32,962	409	33,371
Mar.	42,614	436	43,050
Apr.	40,090	310	40,400
May	47,029	425	47,454
June	48,289	529	48,818
July	41,924	264	42,188
Aug.	46,589	623	47,212
Sept.	48,712	367	49,079
Oct.	50,583	448	51,031
Nov.	48,597	255	48,852
Dec.	47,618	200	47,818
1949	397,001	3,561	400,562
1948	457,088	6,030	463,118

U. S. Bureau of the Census

Magnesium and Magnesium-Base Alloy Castings

Shipments—Thousands of Pounds

	1952	1951	1950	1949	1948
Jan.	3,569	2,319	990	963	659
Feb.	3,368	2,416	913	952	655
Mar.	3,319	2,703	1,102	1,053	704
Apr.	3,051	2,858	978	865	673
May	3,001	2,987	965	921	622
June	2,948	2,294	958	935	709
July	2,654	2,211	861	830	554
Aug.	2,722	2,957	1,429	849	703
Sept.		2,551	1,544	861	745
Oct.		2,977	1,661	938	708
Nov.		3,946	1,873	945	728
Dec.		2,916	1,920	941	754

YEARLY SHIPMENTS

1951	33,135	1947	7,691
1950	15,224	1946	8,472
1949	11,053	1945	83,753
1948	8,214	1944	201,487

U. S. Bureau of the Census

Copper and Copper-Base Alloy Castings

Shipments—Thousands of Pounds

	Sand	Permanent Mold	Die	Other	Total
1952					
8 Mos.	583,648	42,278	5,720	16,421	648,067
Jan.	80,376	6,233	875	2,132	89,616
Feb.	77,813	5,204	758	2,456	86,231
Mar.	79,437	6,182	675	2,348	88,642
Apr.	75,590	5,914	784	2,172	84,460
May	73,723	5,420	646	2,114	81,903
June	67,748	4,858	748	2,005	75,359
July	58,931	3,637	574	1,620	64,762
Aug.	70,030	4,830	660	1,574	77,094
Sept.	.....	....	....	....	......
Oct.	.....	....	....	....	......
Nov.	.....	....	....	....	......
Dec.	.....	....	....	....	......
1951	1,056,226	69,943	13,132	38,240	1,177,541
Jan.	95,481	6,734	1,240	3,214	106,669
Feb.	90,859	5,746	1,265	2,979	100,849
Mar.	103,931	6,787	1,394	3,273	115,385
Apr.	95,264	6,154	1,097	3,119	105,634
May	98,694	6,356	1,164	3,667	109,881
June	92,256	5,692	1,347	3,485	102,780
July	72,147	4,321	1,044	2,524	80,036
Aug.	84,503	5,422	1,268	3,831	95,024
Sept.	79,676	5,493	1,079	3,319	89,567
Oct.	88,332	6,237	915	3,871	99,355
Nov.	82,270	6,043	719	3,070	92,102
Dec.	72,813	4,958	600	1,888	80,259
1951	1,056,226	69,943	13,132	38,240	1,177,541
1950	953,590	55,614	15,099	32,670	1,056,973
1949	671,080	38,767	9,499	24,475	743,821
1948	947,044	60,552	13,642	29,217	1,050,455
1947	969,261	51,800	13,138	27,663	1,061,862
1946	974,019	56,071	10,651	24,855	1,065,596
1945	......	.....	.....	.....	1,008,000
1944	......	.....	.....	.....	1,446,200
1943	......	.....	.....	.....	1,522,000

U. S. Bureau of the Census

Aluminum and Aluminum-Base Alloy Castings

Shipments—Thousands of Pounds

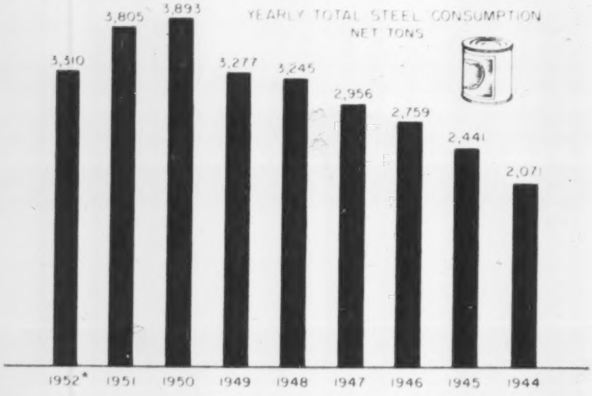
	Sand	Permanent Mold	Die	Other	Total
1952					
8 Mos.	145,558	103,522	107,250	11,127	367,457
Jan.	18,051	12,236	13,884	2,253	46,424
Feb.	17,451	13,445	13,012	939	44,847
Mar.	19,017	13,673	12,880	878	46,448
Apr.	19,451	14,631	14,482	1,260	49,824
May	18,317	14,292	13,907	1,236	47,752
June	18,452	11,982	13,860	1,016	45,310
July	16,342	10,866	12,341	542	40,091
Aug.	18,477	12,397	12,884	3,003	46,761
Sept.	.....	.....	.....	....	.....
Oct.	.....	.....	.....	....	.....
Nov.	.....	.....	.....	....	.....
Dec.	.....	.....	.....	....	.....
1951	206,671	172,729	157,756	13,277	550,433
Jan.	17,770	18,824	14,882	892	52,368
Feb.	17,420	16,962	15,114	806	50,302
Mar.	19,698	16,656	15,087	841	52,282
Apr.	17,982	16,864	14,499	793	50,138
May	18,463	17,594	14,026	809	50,892
June	17,347	13,609	13,085	869	44,910
July	13,514	9,493	10,459	1,017	34,483
Aug.	17,813	14,452	11,767	1,175	45,207
Sept.	16,490	11,793	12,293	1,288	41,864
Oct.	17,694	13,495	13,049	1,181	45,419
Nov.	16,278	11,725	12,604	1,054	41,661
Dec.	16,202	11,262	10,891	2,552	40,907
1951	206,671	172,729	157,756	13,277	550,433
1950	184,782	181,366	167,201	9,733	543,082
1949	122,604	123,523	98,340	7,311	351,778
1948	153,845	183,627	128,903	5,242	471,617
1947	163,321	186,783	115,644	2,090	467,838
1946	160,845	153,138	73,702	1,026	388,711
1945	213,892	108,259	70,667	2,189	395,007
1944	321,200	106,200	84,200	2,800	514,400
1943	304,118	89,675	65,742	n.a.	459,535

U. S. Bureau of the Census

n.a.—Not available

METAL CANS

Shipments in Terms of Net Tons of Steel Consumed



	Food Cans	Nonfood Cans	Total	For Sale
1952				
8 Mos.	1,655,510	869,412	2,524,922	2,200,941
Jan.	143,997	90,375	234,372	195,980
Feb.	144,439	91,209	235,648	199,445
Mar.	157,279	109,641	266,920	228,841
Apr.	173,414	113,809	287,223	240,976
May	175,158	102,471	277,629	239,311
June	218,947	114,469	333,416	287,127
July	293,370	130,524	423,894	388,040
Aug.	348,906	116,914	465,820	421,221
Sept.	....	....	....	....
Oct.	....	....	....	....
Nov.	....	....	....	....
Dec.	....	....	....	....
1951	2,558,591	1,245,960	3,804,551	3,309,592
Jan.	160,993	111,336	272,329	234,832
Feb.	148,969	90,990	239,959	204,336
Mar.	165,194	103,168	268,362	224,464
Apr.	169,618	106,706	276,324	234,784
May	206,284	102,076	308,360	259,480
June	218,952	90,567	309,519	267,233
July	263,719	92,638	356,357	318,391
Aug.	367,257	115,931	483,188	428,044
Sept.	306,610	110,768	417,378	371,686
Oct.	254,635	119,565	374,200	333,018
Nov.	156,035	107,433	263,468	229,422
Dec.	140,325	94,782	235,107	203,902
1950	2,550,949	1,342,435	3,893,384	3,423,602
Jan.	137,001	72,475	209,476	176,871
Feb.	121,155	77,321	198,476	163,207
Mar.	138,090	98,598	236,688	193,268
Apr.	130,978	93,658	224,636	188,419
May	164,196	118,834	283,030	242,092
June	228,829	127,448	356,277	312,821
July	264,450	132,437	396,887	364,710
Aug.	395,390	156,326	551,716	498,634
Sept.	310,959	120,344	431,303	383,033
Oct.	230,791	119,225	350,016	313,376
Nov.	192,847	108,694	301,541	265,819
Dec.	236,263	117,075	353,338	321,352
1949	2,261,432	1,015,493	3,276,925	2,845,709
1948	2,317,487	927,658	3,245,145	2,771,104
1947	2,146,601	809,515	2,956,116	2,499,621
1946	2,305,359	454,160	2,759,519	2,348,681
1945	2,030,277	411,297	2,441,574	•2,275,438
1944	1,827,038	244,556	2,071,594	•1,760,855

U. S. Bureau of the Census

• Estimated

Commercial Closures

Production In Thousands

	Metal Caps	Plastic Caps†
1952		
9 Mos.	7,691,144	1,597,767
Jan.	750,630	225,558
Feb.	712,320	183,381
Mar.	788,289	174,027
Apr.	904,359	199,266
May	905,639	165,815
June	868,083	141,468
July	855,119	142,972
Aug.	952,943	173,524
Sept.	953,762	191,756
Oct.	....	....
Nov.	....	....
Dec.	....	....
1951	11,449,204	2,850,886
Jan.	1,213,055	271,585
Feb.	1,104,535	238,973
Mar.	1,294,349	241,504
Apr.	1,249,110	236,318
May	1,157,991	246,445
June	1,069,437	243,997
July	856,842	211,060
Aug.	868,413	250,015
Sept.	695,537	231,283
Oct.	748,731	277,515
Nov.	600,722	218,872
Dec.	590,482	183,319
1950	11,688,624	2,562,821
Jan.	778,887	171,796
Feb.	743,543	164,564
Mar.	856,056	204,545
Apr.	776,015	179,993
May	895,729	192,381
June	918,102	186,555
July	936,150	180,395
Aug.	1,264,351	255,827
Sept.	1,169,987	273,773
Oct.	1,236,265	276,622
Nov.	1,074,279	248,186
Dec.	1,039,260	228,184
1949	8,109,483	1,951,992
1948	8,784,758	1,994,976

† Not including caps for collapsible tubes

U. S. Bureau of the Census

Tin Mill Products Consumed in Producing Closures

Consumption in Terms of Base Boxes

	Commercial Metal Caps	Crowns	Home Canning Closures
1952			
9 Mos.	1,713,245	2,453,549	498,629
Jan.	167,394	224,952	52,116
Feb.	163,026	236,811	66,994
Mar.	190,632	252,218	76,446
Apr.	196,737	271,028	73,104
May	200,499	296,778	67,389
June	198,727	294,224	57,625
July	192,565	267,203	38,263
Aug.	207,522	286,481	34,032
Sept.	196,143	323,854	32,660
Oct.	....	....	....
Nov.	....	....	....
Dec.	....	....	....
1951	2,325,327	3,237,970	681,438
Jan.	259,506	303,542	54,992
Feb.	228,664	277,550	59,733
Mar.	261,904	329,994	66,436
Apr.	250,585	308,918	73,191
May	238,090	295,306	90,855
June	202,553	278,783	88,773
July	190,317	268,113	57,636
Aug.	160,024	331,297	35,232
Sept.	133,098	243,180	39,772
Oct.	151,202	242,505	34,408
Nov.	131,158	193,992	38,064
Dec.	118,226	164,690	42,349
1950	2,603,125	3,400,418	
Jan.	176,741	211,207	
Feb.	178,458	215,116	
Mar.	215,016	271,764	
Apr.	193,599	253,474	
May	209,631	300,942	
June	223,290	329,706	
July	226,930	336,233	
Aug.	248,048	352,812	
Sept.	236,056	296,769	
Oct.	266,665	281,112	
Nov.	219,925	286,271	
Dec.	208,763	265,012	
1949	1,957,495	2,793,078	

U. S. Bureau of the Census

Aluminum Consumed in Producing Closures

Pounds

	Commercial Closures	Milk Bottle Closures	Foil Liners	Total
1952				
Jan.	282,769	430,683	140,452	853,904
Feb.	278,672	417,013	149,281	844,966
Mar.	312,235	404,285	140,483	857,003
Apr.	350,024	338,076	167,185	855,285
May	356,380	370,096	162,929	889,405
June	390,414	371,573	196,691	958,678
July	375,424	380,883	206,999	963,306
Aug.	432,413	333,859	240,466	1,006,738
Sept.	507,056	397,363	264,363	1,168,782
Oct.	......	......	......	......
1951				
Aug.	351,575	374,450	220,014	946,039
Sept.	260,131	357,196	186,961	804,288
Oct.	241,001	443,085	147,334	831,420
Nov.	226,227	429,199	140,841	796,267
Dec.	310,961	397,903	112,205	821,069

Heavy Steel Barrels and Drums

Shipments for Sale—Number of Units

	1952	1951	1950
Jan.	2,085,445	2,765,782	1,634,847
Feb.	1,961,084	2,312,972	1,757,558
Mar.	2,007,747	2,761,637	2,095,076
Apr.	2,207,351	2,383,932	1,720,615
May	2,117,392	2,605,254	1,967,400
June	1,655,204	2,631,655	2,088,847
July	1,628,502	2,365,606	2,127,548
Aug.	1,963,612	2,780,997	2,703,539
Sept.	2,187,581	2,321,837	2,435,257
Oct.	....	2,510,655	2,517,389
Nov.	....	2,146,732	2,588,112
Dec.	....	2,175,931	2,604,369

YEARLY TOTALS

1951	29,762,990	1943	27,219,206
1950	26,240,518	1942	21,234,721
1949	23,109,638	1941	18,332,143
1948	27,069,717	1940	13,556,443
1947	27,061,963	1939	12,158,445
1946	22,729,346	1938	8,550,299
1945	22,251,101	1937	9,869,212
1944	19,931,227	1936	8,600,493

Light Steel Barrels and Drums

Shipments for Sale—Number of Units

	1952	1951	1950
Jan.	635,000	765,395	513,424
Feb.	586,075	641,537	532,975
Mar.	614,497	747,745	580,987
Apr.	741,842	695,253	521,607
May	685,308	817,546	646,127
June	529,572	781,015	713,431
July	588,749	684,319	690,365
Aug.	612,130	724,636	790,923
Sept.	573,438	608,393	675,801
Oct.	....	630,830	722,732
Nov.	....	624,022	763,928
Dec.	....	569,649	664,235

YEARLY TOTALS

1951	8,290,340	1943	3,941,426
1950	7,816,535	1942	4,541,108
1949	6,079,913	1941	3,757,565
1948	7,346,312	1940	2,805,284
1947	6,032,304	1939	2,592,129
1946	6,432,138	1938	1,964,951
1945	6,564,746	1937	2,145,766
1944	5,173,000	1936	1,904,195

Steel Shipping Packages, Kegs and Pails

Shipments for Sale—Number of Units

	1952	1951	1950
Jan.	4,669,367	5,956,581	4,381,331
Feb.	4,387,099	5,448,459	3,902,982
Mar.	4,771,698	6,874,845	4,819,030
Apr.	5,275,376	6,875,025	4,643,423
May	5,462,397	7,046,989	4,882,519
June	4,613,961	7,100,946	6,017,088
July	4,156,098	6,532,309	5,554,599
Aug.	4,983,748	7,058,276	6,804,567
Sept.	6,068,495	5,679,750	6,205,583
Oct.	....	5,626,639	6,448,072
Nov.	....	5,220,148	6,349,589
Dec.	....	4,261,213	6,119,919

YEARLY TOTALS

1951	73,681,180	1948	57,254,935
1950	66,128,702	1947	57,581,115
1949	52,761,170	1946	51,808,792

U. S. Bureau of the Census.

STEEL & IRON REQUIRED FOR MODERN-DAY PRODUCTS

Product	Steel lb	Iron lb
Automobile	3,545	
Bicycle, Man's 26-in. Deluxe	69	
Bus, 50-passenger, (weight 23,175 lb)	10,960	1,958
Combine, Grain	5,579	1,251
Freight Car:		
Box (50-ton capacity)	35,540	6,000
Covered Hopper (70-ton capacity)	52,940	
Flat (50-ton capacity)	41,660	6,000
Hopper (50-ton capacity)	35,920	6,000
Ore (70-ton capacity)	42,300	
Refrigerator (40-ton capacity)	38,340	5,600
Hay Baler, Pickup type	2,115	1,602
House, Six-Room (Total)	8,482	
Bathroom	300	
Conduit	140	
Doors, Steel	160	
Flashing & miscellaneous sheets	200	
Frames and sills	480	
Gutters and downspouts	475	
Hardware	90	
Heating equipment	640	
Kitchen	800	
Lath	1,800	
Laundry tubs	10	
Nails and wire	600	
Pipe, Gas, Water and Heating	1,200	
Radiator grilles	75	
Screen	32	
Structural shapes and columns	680	
Windows	800	
Lathe, Turret	3,856	4,200
Lawn Mower	28	
Locomotive, Diesel-Electric	191,000	9,700
Motor, ¼-hp Electric (22 lb)	12	7
Motor, 5000-hp Electric (208,000 lb)	168,000	10,000
Piano	28	194
Printing Press, Four-Color Sheet Fed Gravure	53,400	57,500
Refrigerator	172	
Ship, Passenger (S. S. Independence)	31,952,000†	
Sleeping Car, Railroad (21-Roomette)	115,662†	
Tractor, Farm	1,543	
Truck, Railroad Freight Car	6,783	85
Truck, Railroad Passenger Car	18,236	224
Washing Machine	38	

American Iron & Steel Institute

† Steel and iron combined.

CROWNS

Production—In Gross

	1952	1951	1950
Jan.	22,716,564	30,924,924	21,364,828
Feb.	24,315,848	29,040,169	22,066,480
Mar.	25,357,160	34,005,978	26,280,833
Apr.	27,773,664	31,453,286	25,353,208
May	30,240,777	30,282,249	30,530,557
June	30,772,916	28,460,663	33,036,101
July	28,531,306	26,860,596	33,835,743
Aug.	29,461,913	33,637,583	36,612,817
Sept.	32,982,663	24,691,564	30,290,839
Oct.	....	24,625,215	28,757,797
Nov.	....	19,900,328	29,259,860
Dec.	....	16,902,625	26,807,122
Total	....	330,785,480	344,196,185

YEARLY TOTALS

1949	284,537,496	1948	333,448,503

U. S. Bureau of the Census

METALWORKING FACTS AND FIGURES

Beehive Metallurgical Coke

Average Price—Net Ton

	1952	1951	1950	1949
Connellsville, furnace	$14.75	$14.75	$14.06	$13.79
Connellsville, foundry	17.24	17.50	15.88	16.27
New River, foundry	21.08	20.70	18.83	17.35
Wise county, foundry	15.95	15.95	15.83	15.35
Wise county, furnace	15.20	15.20	15.08	14.60

Oven Foundry Coke

Average Price—Net Ton

Ovens	1952	1951	1950	1949
Kearney, N. J.	$22.85	$22.75	$22.18	$21.98
Milwaukee	23.88	23.75	21.18	20.94
Chicago	23.13	22.83	22.00	20.19

Lake Superior Iron Ore

(Per gross ton; 51½% iron)

	1952	1951	1950	1949
Bessemer Old Range	$9.02	$8.70	$8.10	$7.60
Bessemer Mesabi	8.77	8.45	7.85	7.35
Nonbessemer Old Range	8.87	8.55	7.95	7.45
Nonbessemer Mesabi	8.62	8.30	7.70	7.20
High Phosphorus	8.62	8.30	7.70	7.20

1952 WEEKLY INDEX OF FINISHED STEEL PRICES

(U. S. Bureau of Labor Statistics)

1947-1949 = 100

Upon STEEL's request, the BLS in the last half of 1952 made its index of finished steel prices available on a weekly basis. Each issue of STEEL carries the latest weekly figure.

Week Ended	Index				
		Sept. 2	130.8	Nov. 4	130.5
....		Sept. 9	130.8	Nov. 11	130.5
July 15	124.4	Sept. 16	130.8	Nov. 18	130.5
July 22	124.4	Sept. 23	130.8	Nov. 25	130.5
July 29	130.9	Sept. 30	130.8	Nov. Av.	130.5
July Av.	124.4	Sept. Av.	130.8	Dec. 2	130.5
Aug. 5	130.9	Oct. 7	130.8	Dec. 9	
Aug. 12	130.8	Oct. 14	130.7	Dec. 16	
Aug. 19	130.8	Oct. 21	130.7	Dec. 23	
Aug. 26	130.8	Oct. 28	130.5	Dec. 30	
Aug. Av.	130.8	Oct. Av.	130.7	Dec. Av.	

FINISHED STEEL—WEIGHTED PRICE COMPOSITE

(Based on average shipments and prices of the following products during 5-year base period 1935-1939: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip)

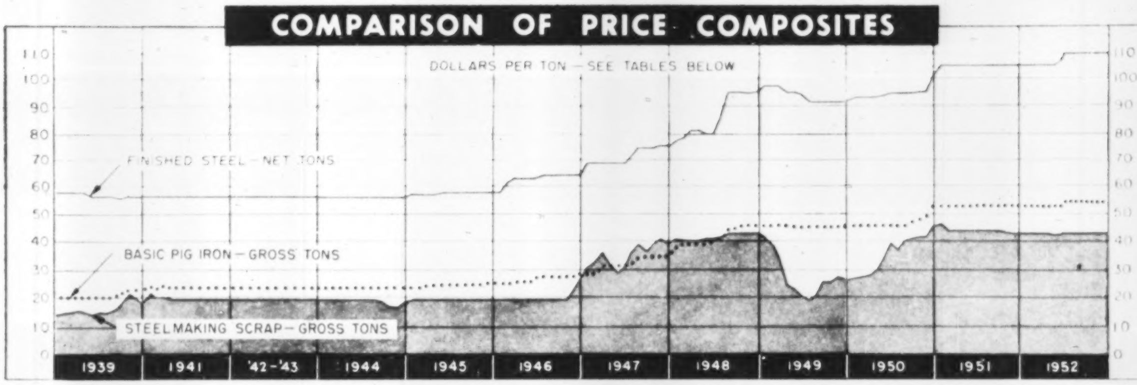
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Avg.
1952	171.92	171.92	171.92	171.92	171.92	171.92	173.83	181.31	181.31	181.31	181.31	181.31	175.99
1951	171.92	171.92	171.92	171.92	171.92	171.92	171.92	171.92	171.92	171.92	171.92	171.92	171.92
1950	156.13	156.13	156.13	156.13	156.13	156.54	156.69	156.95	156.99	157.53	157.76	167.87	157.57
1949	155.05	155.05	154.85	154.01	152.90	152.90	152.80	152.52	152.52	152.52	152.52	154.75	153.53
1948	132.93	134.56	135.91	135.91	135.02	134.56	143.08	151.99	151.86	151.86	151.86	151.86	142.62
1947	117.90	118.67	118.67	118.67	118.67	118.67	120.39	128.96	128.96	128.96	129.28	129.28	123.09
1946	101.87	106.82	111.62	111.62	111.62	111.86	112.04	112.04	112.04	112.04	112.04	112.82	110.70
1945	100.32	100.65	100.65	100.65	101.10	101.78	101.78	101.85	101.87	101.87	101.87	101.87	101.36
1944	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16
1943	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16
1942	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16
1941	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16
1940	99.16	99.16	99.16	97.75	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.16	99.04
1939	100.50	100.50	100.50	100.50	99.07	98.46	98.42	98.42	98.42	98.54	98.78	99.16	99.27
1938	109.94	109.73	109.65	109.65	109.65	107.84	101.84	101.84	101.78	101.31	100.83	100.50	105.38
1937	98.44	98.49	108.25	109.60	109.94	109.94	109.94	109.94	109.94	109.94	109.94	109.94	107.86

FINISHED STEEL—ANNUAL PRICE AVERAGES

(Per net ton, Pittsburgh)

	SHEETS			STRIP		Tin	BARS				Basic	Standard
	H.R.	C.R.	Gal.	H.R.	C.R.	Plate	H.R.	C.F.	Plates	Shapes	Wire	Nails
1952	$74.52	$88.95	$98.38	$79.51	$104.39	$176.17	$76.17	$94.25	$75.73	$74.73	$101.88	$123.03
1951	73.00	87.00	96.00	77.60	101.60	174.00	74.00	91.00	74.00	73.00	98.60	120.00
1950	67.50	82.42	88.67	68.33	86.29	150.00	69.42	83.29	70.33	68.42	91.13	107.67
1949	65.22	80.08	88.00	67.75	84.33	155.00	67.55	80.04	68.75	65.24	84.05	105.92
1948	60.17	74.83	82.80	62.40	80.36	135.75	62.84	75.63	63.84	60.17	80.10	107.33
1947	52.60	67.03	74.05	52.60	67.03	116.00	54.60	67.03	55.53	52.53	70.67	84.44
1946	48.03	64.80	79.50	47.33	60.56	104.38	49.46	61.21	49.38	46.38	60.25	69.61
1945	43.92	61.00	73.50	42.00	56.00	100.00	44.25	53.83	44.50	42.00	53.83	57.08
1944	42.00	61.00	70.00	42.00	56.00	100.00	43.00	53.00	42.00	42.00	52.00	51.00
1943	42.00	61.00	70.00	42.00	56.00	100.00	43.00	53.00	42.00	42.00	52.00	51.00
1942	42.00	61.00	70.00	42.00	56.00	100.00	43.00	53.00	42.00	42.00	52.00	51.00
1941	42.00	61.00	70.00	42.00	56.00	109.00	43.00	53.00	42.00	42.00	52.00	51.00
1940	41.80	60.80	70.00	41.75	55.75	100.00	42.00	53.00	42.00	42.00	52.00	51.00
1939	41.25	62.08	70.00	41.25	57.08	100.00	43.75	53.33	42.00	42.00	52.00	49.17
1938	45.42	66.67	72.92	45.25	61.08	106.00	47.00	56.00	43.50	43.50	55.00	52.00
1937	47.08	69.92	74.50	47.08	62.75	104.33	48.08	56.75	44.25	44.25	56.92	53.25
1936	38.25	60.00	63.25	38.25	52.33	105.00	38.50	44.42	37.00	37.00	48.17	42.83
1935	37.00	59.00	62.00	37.00	52.00	105.00	36.33	40.00	36.00	36.00	46.00	50.58
1934	37.08	58.75	61.25	37.17	51.75	105.00	36.17	42.00	35.67	35.67	45.42	50.58
1933	33.17	51.83	54.92	31.83	42.17	88.67	32.75	36.08	32.17	32.50	42.25	39.92
1932	34.08	55.17	56.33	28.92	39.75	93.75	31.67	35.75	31.67	31.67	44.00	39.00
1931	37.25	62.83	57.58	30.58	43.33	98.75	32.50	41.67	32.33	32.08	44.00	37.75
1930	40.17	73.00	63.00	33.67	49.33	103.75	34.42	41.83	34.17	34.17	46.67	42.50
1929	43.33	81.58	71.33	37.75	55.33	107.00	38.50	45.25	38.56	38.58	49.42	51.58

COMPARISON OF PRICE COMPOSITES



FINISHED STEEL—ARITHMETICAL PRICE COMPOSITE

(In dollars per net ton, computed from industry-wide prices on carbon steel: Hot-rolled sheets, cold-rolled sheets, cold-rolled strip, hot-rolled bars, plates, structural shapes, basic wire, standard nails, tin plate, and standard and line pipe. Based on basing point prices through June 1948; mill prices for subsequent months.)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Avg.
1952	$106.32	$106.32	$106.32	$106.32	$106.32	$106.32	$107.25	$110.98	$110.98	$110.98	$110.98	$110.98	$108.34
1951	106.32	106.32	106.32	106.32	106.32	106.32	106.32	106.32	106.32	106.32	106.32	106.32	106.32
1950	92.92	93.09	93.18	93.19	93.65	94.35	94.36	94.44	94.50	94.91	95.09	100.76	94.54
1949	97.75	97.77	97.17	94.18	93.36	92.06	91.82	91.62	91.55	91.62	91.64	91.89	93.54
1948	78.26	79.86	81.14	81.14	80.27	80.27	86.18	95.05	95.05	95.05	95.16	95.50	86.91
1947	69.59	69.82	69.82	69.82	69.82	69.82	70.80	75.41	75.41	75.41	76.09	76.15	72.33
1946	58.27	60.91	63.54	63.54	63.54	64.09	64.45	64.45	64.45	64.45	64.45	64.75	63.41
1945	57.35	57.55	57.55	57.55	57.73	58.27	58.27	58.27	58.27	58.27	58.27	58.27	57.97
1944	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73
1943	56.72	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73
1942	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73
1941	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73	56.73
1939	57.36	57.36	57.36	57.36	56.74	56.36	56.29	56.27	56.27	56.49	56.54	56.73	56.76

BASIC PIG IRON PRICE COMPOSITE

Average of basic pig iron prices (per gross ton) at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Pittsburgh, Granite City, Youngstown

	Jan.	Feb.	Mar.	Apr.	May.	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Avg.
1952	$52.16	$52.16	$52.16	$52.16	$52.16	$52.16	$52.66	$54.66	$54.66	$54.66	$54.66	$54.66	$53.24
1951	52.16	52.16	52.16	52.16	52.16	52.16	52.16	52.16	52.16	52.16	52.16	52.16	52.16
1950	45.70	45.97	45.97	45.97	45.97	45.97	45.97	45.97	47.08	47.98	49.04	52.16	46.98
1949	46.26	46.22	46.22	46.16	45.66	45.60	45.60	45.60	45.60	45.60	45.60	45.60	45.81
1948	38.50	39.30	39.34	39.21	39.66	40.49	41.42	44.12	44.62	46.19	46.29	46.29	42.12
1947	29.56	29.59	32.40	32.49	32.49	32.49	33.82	36.06	36.14	36.18	36.38	36.31	33.66
1946	24.75	24.75	25.13	25.50	25.50	27.50	27.50	27.50	27.50	27.50	27.50	29.10	26.64
1945	23.00	23.50	24.00	24.00	24.00	24.00	24.00	24.00	24.00	24.19	24.75	24.75	24.01
1944	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00
1943	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00
1942	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00
1941	22.80	22.95	23.05	23.05	23.05	23.05	23.05	23.05	23.05	23.05	23.05	23.05	23.02
1939	20.05	20.05	20.05	20.05	20.05	20.05	20.05	20.05	21.05	22.05	22.05	22.05	20.68

MALLEABLE PIG IRON COMPOSITE

Average of malleable pig iron prices (per gross ton) at Bethlehem, Buffalo, Chicago, Cleveland, Pittsburgh, Granite City, Youngstown.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Avg.
1952	$53.27	$53.27	$53.27	$53.27	$53.27	$53.27	$53.77	$55.77	$55.77	$55.77	$55.77	$55.77	$54.35
1951	53.27	53.27	53.27	53.27	53.27	53.27	53.27	53.27	53.27	53.27	53.27	53.27	53.27
1950	47.27	47.27	47.27	47.27	47.27	47.27	47.33	47.49	48.15	49.46	50.27	53.27	48.30
1949	47.39	47.34	47.34	47.31	47.27	47.27	47.27	47.27	47.27	47.27	47.27	47.27	47.30
1948	39.58	40.39	40.45	40.29	40.70	41.54	42.32	44.87	45.30	47.20	47.41	47.41	43.12
1947	30.79	30.79	33.50	33.71	33.71	33.71	34.94	37.07	37.16	37.19	37.49	37.40	34.79
1946	26.04	26.04	26.41	26.79	26.79	28.79	28.79	28.79	28.79	28.79	28.79	30.36	27.93
1945	24.29	24.79	25.29	25.29	25.29	25.29	25.29	25.29	25.29	25.48	26.04	26.04	25.31
1944	24.29	24.29	24.29	24.29	24.29	24.29	24.29	24.29	24.29	24.29	24.29	24.29	24.29

No. 2 FOUNDRY PIG IRON COMPOSITE

Average of No. 2 foundry pig iron prices (per gross ton) at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City, Youngstown.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Avg.
1952	$52.54	$52.54	$52.54	$52.54	$52.54	$52.54	$53.04	$55.04	$55.04	$55.04	$55.04	$55.04	$53.62
1951	52.54	52.54	52.54	52.54	52.54	52.54	52.54	52.54	52.54	52.54	52.54	52.54	52.54
1950	46.20	46.47	46.47	46.47	46.47	46.47	46.57	46.85	47.55	49.20	49.54	52.54	47.57
1949	46.67	46.63	46.63	46.60	46.13	46.67	46.08	46.10	46.10	46.10	46.10	46.10	46.28
1948	38.94	39.77	39.81	39.68	40.10	40.96	41.83	44.47	44.58	46.50	46.69	46.69	42.50
1947	30.17	30.17	32.80	32.99	32.99	32.99	34.32	36.54	36.62	36.64	36.85	36.78	34.16
1946	25.42	25.42	25.80	26.17	26.17	28.17	28.17	28.17	28.17	28.17	28.17	29.73	27.31
1945	23.67	24.17	24.67	24.67	24.67	24.67	24.67	24.67	24.67	24.86	25.42	25.42	24.69
1944	23.67	23.67	23.67	23.67	23.67	23.67	23.67	23.67	23.67	23.67	23.67	23.67	23.67

STEELMAKING SCRAP PRICE COMPOSITE

Average of No. 1 heavy melting steel scrap prices (per gross ton) at Pittsburgh, Chicago and eastern Pennsylvania.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Avg.
1952	$43.00	$43.00	$43.00	$43.00	$43.00	$42.63	$42.60	$43.00	$43.00	$43.00	$43.00	$43.00	$42.94
1951	46.33	44.00	44.00	44.00	44.00	44.00	44.00	44.00	44.00	43.60	43.00	43.00	43.99
1950	26.93	27.52	28.23	29.40	33.82	39.25	37.04	40.00	40.93	41.37	41.33	45.50	35.94
1949	41.54	38.48	34.60	24.06	22.29	20.85	19.21	20.86	26.07	26.71	28.96	28.03	27.64
1948	40.75	40.48	40.21	40.41	40.67	40.67	41.43	43.33	43.33	43.25	43.25	43.25	41.75
1947	31.20	33.50	37.25	33.94	29.75	32.48	37.23	39.00	37.83	39.85	40.42	40.13	36.05
1946	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	22.22	27.69	20.13
1945	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17
1944	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	18.00	16.50	16.40	18.54	18.95
1943	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17
1942	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17
1941	21.00	20.05	20.15	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.17	19.50
1939	14.90	14.95	15.15	14.80	14.10	14.60	14.90	15.35	18.15	21.55	20.15	17.95	16.40

METALWORKING FACTS AND FIGURES

AVERAGE MONTHLY QUOTATIONS IN 1952

Finished Steel Prices are cents per pound unless otherwise noted; coke, dollars per net ton; other products, dollars per gross ton. All prices are mill or furnace, unless otherwise noted. December figures subject to revision.

PITTSBURGH

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
Structural Shapes	3.65	3.65	3.65	3.65	3.65	3.65	3.69	3.85	3.85	3.85	3.85	3.85
Plates	3.70	3.70	3.70	3.70	3.70	3.70	3.74	3.90	3.90	3.90	3.90	3.90
Bars, Hot Rolled	3.70	3.70	3.70	3.70	3.70	3.70	3.75	3.95	3.95	3.95	3.95	3.95
Bars, Cold Finished	4.55	4.55	4.55	4.55	4.55	4.55	4.625	4.925	4.925	4.925	4.925	4.925
Sheets, Hot Rolled	3.65	3.65	3.65	3.65	3.65	3.65	3.685	3.825	3.825	3.825	3.825	3.825
Sheets, Cold Rolled	4.35	4.35	4.35	4.35	4.35	4.35	4.395	4.575	4.575	4.575	4.575	4.575
Sheets, No. 10 Galvanized	4.80	4.80	4.80	4.80	4.80	4.80	4.855	5.075	5.075	5.075	5.075	5.075
Strip, Hot Rolled	3.88	3.88	3.88	3.88	3.88	3.88	3.924	4.100	4.100	4.100	4.100	4.100
Strip, Cold Rolled	4.98	4.98	4.98	4.98	4.98	4.98	5.091	5.533	5.533	5.533	5.533	5.533
Standard Spikes	6.15	6.15	6.15	6.15	6.15	6.15	6.250	6.650	6.650	6.650	6.650	6.650
Plain Wire	4.93	4.93	4.93	4.93	4.93	4.93	5.006	5.308	5.308	5.308	5.308	5.308
Wire Nails	6.00	6.00	6.00	6.00	6.00	6.00	6.070	6.350	6.350	6.350	6.350	6.350
Structural Rivets	7.85	7.85	7.85	7.85	7.85	7.85	7.85	7.85	7.85	7.85	7.85	7.85
Steel Pipe, Buttweld 1-3 in., % discount from list	42.5	42.5	42.5	42.5	42.5	42.5	41.8	39	39	39	39	39
Tin Plate, 1.50 pound coating (base box)	$8.70	$8.70	$8.70	$8.70	$8.70	$8.70	$8.75	$8.95	$8.95	$8.95	$8.95	$8.95
Pig Iron, Bessemer, Neville Island	53.00	53.00	53.00	53.00	53.00	53.00	53.50	55.50	55.50	55.50	55.50	55.50
Pig Iron, Basic, Pittsburgh district ovens	53.00	53.00	53.00	53.00	53.00	53.00	53.50	55.50	55.50	55.50	55.50	55.50
Pig Iron, No. 2 Foundry, Neville Island	52.50	52.50	52.50	52.50	52.50	52.50	53.00	55.00	55.00	55.00	55.00	55.00
Pig Iron, Malleable, Neville Island	52.50	52.50	52.50	52.50	52.50	52.50	53.00	55.00	55.00	55.00	55.00	55.00
Blast Furnace Silvery Pig Iron, 9.01-9.50% Si, Jackson, O., furnace	71.50	71.50	71.50	71.50	71.50	71.50	72.10	74.50	74.50	74.50	74.50	74.50
Billets, Bessemer and Open-Hearth, Rerolling	56.00	56.00	56.00	56.00	56.00	56.00	56.60	59.00	59.00	59.00	59.00	59.00
Wire Rods (cents per pound)	4.20	4.20	4.20	4.20	4.20	4.20	4.245	4.425	4.425	4.425	4.425	4.425
Furnace Coke, spot, Connellsville, Pa.	$14.75	$14.75	$14.75	$14.75	$14.75	$14.75	$14.75	$14.75	$14.75	$14.75	$14.75	$14.75
Foundry Coke, spot, Connellsville, Pa.	17.50	17.50	17.50	17.50	17.50	17.38	17.00	17.00	17.00	17.00	17.00	17.00
Scrap, No. 1 Heavy Melting Steel	44.00	44.00	44.00	44.00	44.00	44.00	44.00	44.00	44.00	44.00	44.00	44.00
Scrap, Low Phos. (Bar crops and plates)	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
Scrap, No. 1 Cast, f.o.b. shipping point	49.00	49.00	49.00	49.00	46.00*	46.00*	46.30*	48.00*	48.50*	48.50*	48.50*	48.50*

* Delivered, consumer's plant.

CHICAGO

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
Bars, Steel	3.70	3.70	3.70	3.70	3.70	3.70	3.75	3.95	3.95	3.95	3.95	3.95
Plates	3.70	3.70	3.70	3.70	3.70	3.70	3.74	3.90	3.90	3.90	3.90	3.90
Structural Shapes	3.65	3.65	3.65	3.65	3.65	3.65	3.69	3.85	3.85	3.85	3.85	3.85
Bars, Rail Steel	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.875	4.875	4.875	4.875
Sheets, Cold Rolled	4.35	4.35	4.35	4.35	4.35	4.35	4.395	4.575	4.575	4.575	4.575	4.575
Pig Iron, No. 2 Foundry	$52.50	$52.50	$52.50	$52.50	$52.50	$52.50	$53.00	$55.00	$55.00	$55.00	$55.00	$55.00
Pig Iron, Malleable	52.50	52.50	52.50	52.50	52.50	52.50	53.00	55.00	55.00	55.00	55.00	55.00
Scrap, No. 1 Heavy Melting Steel	42.50	42.50	42.50	42.50	42.50	42.50	42.50	42.50	42.50	42.50	42.50	42.50
Scrap Rails for Rerolling	52.50	52.50	52.50	52.50	52.50	52.50	52.50	52.50	52.50	52.50	52.50	52.50
Scrap, No. 1 Cupola Cast, f.o.b. shipping point	49.00	49.00	49.00	49.00	46.50*	45.00*	45.00*	51.00*	49.50*	47.50*	45.25*	45.00*

* Delivered consumer's plant.

EASTERN PENNSYLVANIA

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
Plates, Sparrows Point, Md.	3.70	3.70	3.70	3.70	3.70	3.70	3.74	3.90	3.90	3.90	3.90	3.90
Structural Shapes, del. Philadelphia	3.918	3.918	3.918	3.918	3.93	3.93	3.97	4.13	4.13	4.13	4.13	4.13
Steel Bars, del. Philadelphia	4.223	4.223	4.223	4.223	4.252	4.252	4.302	4.502	4.502	4.502	4.502	4.502
Sheets, Hot Rolled, Sparrows Point, Md.	3.60	3.60	3.60	3.60	3.60	3.60	3.635	3.775	3.775	3.775	3.775	3.775
Pig Iron, Basic, del. Philadelphia	$56.61	$56.61	$56.61	$56.61	$56.75	$56.75	$57.25	$59.25	$59.25	$59.25	$59.25	$59.25
Pig Iron, No. 2 Foundry, del. Philadelphia	57.11	57.11	57.11	57.11	57.25	57.25	57.75	59.75	59.75	59.75	59.75	59.75
Pig Iron, Standard Low Phos. del. Philadelphia	63.37	63.37	63.37	63.37	63.55	63.55	64.05	66.05	66.05	66.05	66.05	66.05
Scrap, No. 1 Heavy Melting Steel	42.50	42.50	42.50	42.50	42.50	41.38	41.30	42.50	42.50	42.50	42.50	42.50
Scrap, No. 1 Cupola, f.o.b. shipping point	49.00	49.00	49.00	49.00	41.13*	38.50*	41.00*	47.00*	47.00*	49.00*	49.00*	48.00*
Spiegeleisen, 19-21%, Palmerton, Pa., furnace	75.00	75.00	75.00	75.00	75.00	75.00	75.00	82.50	85.00	85.00	85.00	85.00

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* Delivered consumer's plant

COAL CHEMICALS

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
Benzol, per gallon, producers' plants, tank lots	32.50	32.50	32.50	32.50	32.50	32.50	32.50	32.50	32.50	32.50	32.50	32.50
Toluol, one degree, per gallon, producers' plants	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	31.50
Xylol, per gallon, producers' plants, tank lots	29.25	29.25	29.25	29.25	29.25	29.25	29.25	29.25	29.25	29.25	29.25	31.75
Phenol, 40, per pound producers' plants, carlots	17.25	17.25	17.25	17.25	17.25	17.25	17.25	17.25	17.25	17.25	17.25	17.25
Sulphate of Ammonia, per ton, bulk, ovens	38.50	38.50	38.50	38.50	38.50	38.50	38.50	38.50	38.50	38.50	38.50	42.50

NONFERROUS METAL PRICES

(Cents per pound)

	1952 Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.*	Yearly Averages 1952*	1951	1950
Copper Sheets[1]	41.68	41.68	41.68	41.68	41.68	41.68	45.52	45.52	45.52	45.52	45.52	45.52	43.600	41.038	36.445
Copper Rods[1]	37.53	37.53	37.53	37.53	37.53	37.53	41.37	41.37	41.37	41.37	41.37	41.37	39.450	36.888	32.294
Copper Tubing[1]	41.72	41.72	41.72	41.72	41.72	41.72	45.56	45.56	45.56	45.56	45.56	45.56	43.640	41.078	36.472
Yellow Brass Sheets[1]	38.28	38.28	38.28	38.28	38.28	38.28	40.17	40.17	40.17	40.17	40.17	40.17	39.225	37.849	33.124
Yellow Brass Rods[1]	32.63	32.63	32.63	32.63	32.63	32.63	33.85	33.85	33.85	33.85	33.85	33.85	33.240	32.233	27.526
Yellow Brass Tubing[1]	41.29	41.29	41.29	41.29	41.29	41.29	43.18	43.18	43.18	43.18	43.18	43.18	42.235	40.858	36.134
Nickel Silver Sheets[3]	53.14	53.14	53.14	53.14	53.14	53.14	55.08	55.08	55.08	55.08	55.08	55.08	54.110	52.042	35.921
Phosphor Bronze Sheets[4]	61.07	61.07	61.07	61.07	61.07	61.07	64.71	64.71	64.71	64.71	64.71	64.71	62.890	60.444	35.611
Zinc Sheets[1]	26.50	26.50	26.50	26.50	26.50	23.19	23.00	23.00	23.00	23.00	23.00	23.00	24.474	24.900	38.581
Bronze Sheets[2]	41.13	41.13	41.13	41.13	41.13	41.13	44.38	44.38	44.38	44.38	44.38	44.38	42.755	40.553	46.870
Bronze Rods[2]	40.82	40.82	40.82	40.82	40.82	40.82	44.07	44.07	44.07	44.07	44.07	44.07	42.495	40.243	54.765
Bronze Tubing[2]	43.79	43.79	43.79	43.79	43.79	43.79	47.04	47.04	47.04	47.04	47.04	47.04	45.415	43.216	19.750
Yellow Brass Wire[1]	38.57	38.57	38.57	38.57	38.57	38.57	40.46	40.46	40.46	40.46	40.46	40.46	39.515	38.139	33.414
Copper Magnet Wire[5]	34.50	34.50	34.50	34.50	34.50	34.50	38.75	38.75	38.75	38.75	38.75	38.75	36.625	34.500	31.554
Weatherproof Copper Wire[6]	30.60	30.60	30.60	30.60	30.60	30.60	33.85	33.85	33.85	33.85	33.85	33.85	32.225	30.110	27.391
Bare Copper Wire[6]	28.67	28.67	28.67	28.67	28.67	28.67	32.92	32.92	32.92	32.92	32.92	32.92	30.795	29.532	25.787
85-5-5-5 Brass Ingot[7]	27.25	27.25	27.25	27.25	27.25	27.25	27.25	27.25	27.25	27.25	27.25	27.25	27.250	27.250	22.285
80-10-10 Brass Ingot[8]	32.40	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	32.950	32.250	26.606
88-10-2 Brass Ingot[9]	38.80	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	39.900	38.500	31.840
No. 1 Yellow Ingot[10]	23.25	23.25	23.25	23.25	23.25	23.25	23.25	23.25	23.25	23.25	23.25	23.25	23.250	23.250	19.330

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[1] F.o.b. mill. [2] 90% Cu; f.o.b. mill. [3] 18% Ni; f.o.b. mill. [4] Grade A; f.o.b. mill. [5] Carlots; f.o.b. destination. [6] Carlots; f.o.b. eastern mill. [7] No. 115; delivered. [8] No. 305; delivered. [9] No. 215; delivered. [10] No. 405; delivered.

COPPER

Electrolytic, cents per lb, delivered Connecticut Valley

	1952	1951	1950	Yearly Averages	
Jan.	24.500	24.500	18.500	1952*	24.500
Feb.	24.500	24.500	18.500	1951	24.500
Mar.	24.500	24.500	18.500	1950	21.588
Apr.	24.500	24.500	18.940	1949	19.499
May	24.500	24.500	19.962	1948	22.317
June	24.500	24.500	22.231	1947	21.215
July	24.500	24.500	22.500	1946	14.043
Aug.	24.500	24.500	22.870	1945	12.000
Sept.	24.500	24.500	23.500	1944	12.000
Oct.	24.500	24.500	24.500	1943	12.000
Nov.	24.500	24.500	24.500	1942	12.000
Dec.	24.500	24.500	24.500	1941	12.000

ALUMINUM

99% plus, ingots; cents per lb, f.o.b. shipping point

	1952	1951	1950	Yearly Averages	
Jan.	19.000	19.000	17.000	1952*	19.410
Feb.	19.000	19.000	17.000	1951	19.000
Mar.	19.000	19.000	17.000	1950	17.695
Apr.	19.000	19.000	17.000	1949	17.000
May	19.000	19.000	17.192	1948	15.764
June	19.000	19.000	17.500	1947	15.000
July	19.000	19.000	17.500	1946	15.000
Aug.	19.923	19.000	17.500	1945	15.000
Sept.	20.000	19.000	17.680	1944	15.000
Oct.	20.000	19.000	18.970	1943	15.000
Nov.	20.000	19.000	19.000	1942	15.000
Dec.	20.000	19.000	19.000	1941	16.500

NICKEL

Electrolytic Cathodes, 99.9%, base sizes, unpacked, cents per lb, f.o.b. refinery

	1952	1951	1950	Yearly Averages	
Jan.	56.500	50.500	40.000	1952*	56.500
Feb.	56.500	50.500	40.000	1951	54.000
Mar.	56.500	50.500	40.000	1950	44.809
Apr.	56.500	50.500	40.000	1949	40.000
May	56.500	50.500	40.308	1948	36.528
June	56.500	56.500	48.000	1947	35.000
July	56.500	56.500	48.000	1946	31.850
Aug.	56.500	56.500	48.000	1945	35.000
Sept.	56.500	56.500	48.000	1944	35.000
Oct.	56.500	56.500	48.000	1943	35.000
Nov.	56.500	56.500	48.000	1942	35.000
Dec.	56.500	56.500	49.400	1941	35.000

ZINC

Prime Western; cents per lb, East St. Louis

	1952	1951	1950	Yearly Averages	
Jan.	19.500	17.500	9.810	1952*	16.213
Feb.	19.500	17.500	9.750	1951	17.994
Mar.	19.500	17.500	9.944	1950	13.879
Apr.	19.500	17.500	10.690	1949	12.152
May	19.500	17.500	11.990	1948	13.563
June	15.740	17.500	14.769	1947	10.500
July	15.000	17.500	15.000	1946	8.727
Aug.	14.067	17.500	15.000	1945	8.250
Sept.	13.990	17.500	17.100	1944	8.250
Oct.	13.259	19.426	17.500	1943	8.250
Nov.	12.500	19.500	17.500	1942	8.250
Dec.	12.500	19.500	17.500	1941	7.478

LEAD

Common grade; cents per lb, St. Louis

	1952	1951	1950	Yearly Averages	
Jan.	18.800	16.800	11.800	1952*	16.258
Feb.	18.800	16.800	11.800	1951	17.294
Mar.	18.800	16.800	10.763	1950	13.095
Apr.	18.723	16.800	10.420	1949	15.191
May	15.519	16.800	11.521	1948	17.867
June	15.060	16.800	11.608	1947	14.504
July	15.800	16.800	11.460	1946	7.957
Aug.	15.800	16.800	12.726	1945	6.350
Sept.	15.800	16.800	15.600	1944	6.350
Oct.	14.226	18.726	15.840	1943	6.350
Nov.	13.965	18.800	16.800	1942	6.331
Dec.	13.800	18.800	16.800	1941	5.643

TIN

Straits, spot; cents per lb, New York

	1952	1951	1950	Yearly Averages	
Jan.	109.404	171.798	76.020	1952*	120.492
Feb.	121.500	182.716	74.352	1951	127.072
Mar.	121.500	145.730	75.745	1950	95.552
Apr.	121.500	145.735	76.145	1949	99.996
May	121.500	139.923	77.500	1948	99.250
June	121.500	117.962	77.668	1947	77.975
July	121.500	106.000	86.680	1946	54.563
Aug.	121.500	103.000	102.120	1945	52.000
Sept.	121.500	103.000	101.250	1944	52.000
Oct.	121.500	103.000	113.290	1943	52.000
Nov.	121.500	103.000	137.710	1942	52.000
Dec.	121.500	103.000	141.740	1941	52.032

CADMIUM

Regular shapes; dollars per lb, del.

	1952	1951	1950	1949	1948	1947
Jan.	2.55	2.55	2.00	2.00	1.75	1.50
Feb.	2.55	2.55	2.00	2.00	1.75	1.56
Mar.	2.55	2.55	2.00	2.00	1.75	1.69
Apr.	2.55	2.55	2.00	2.00	1.75	1.75
May	2.40	2.55	2.00	2.00	1.75	1.75
June	2.25	2.55	2.11	2.00	1.75	1.75
July	2.20	2.55	2.15	2.00	1.75	1.75
Aug.	2.00	2.55	2.15	2.00	1.90	1.75
Sept.	2.00	2.55	2.34	2.00	1.90	1.75
Oct.	2.00	2.55	2.40	2.00	1.90	1.75
Nov.	2.00	2.55	2.44	2.00	1.94	1.75
Dec.	1.75	2.55	2.55	2.00	2.00	1.75
Av.	2.23	2.55	2.18	2.00	1.82	1.71

COBALT

97-98%; dollars per lb for 500 lb keg

	1952	1951	1950	1949	1948	1947
Jan.	2.40	2.10	1.80	1.65	1.65	1.50
Feb.	2.40	2.10	1.80	1.65	1.65	1.50
Mar.	2.40	2.10	1.80	1.65	1.65	1.50
Apr.	2.40	2.10	1.80	1.80	1.65	1.50
May	2.40	2.10	1.80	1.80	1.65	1.50
June	2.40	2.10	1.80	1.80	1.65	1.50
July	2.40	2.10	1.80	1.80	1.65	1.53
Aug.	2.40	2.10	1.80	1.80	1.65	1.65
Sept.	2.40	2.10	1.80	1.80	1.65	1.65
Oct.	2.40	2.40	1.80	1.80	1.65	1.65
Nov.	2.40	2.40	1.80	1.80	1.65	1.65
Dec.	2.40	2.40	2.025	1.80	1.65	1.65
Av.	2.40	2.18	1.82	1.76	1.65	1.57

IRIDIUM

Dollars per troy ounce

	1952	1951	1950	1949	1948
Jan.	200.00	200.00	105.00	112.50	85.00
Feb.	200.00	200.00	100.00	107.50	86.88
Mar.	200.00	200.00	100.00	105.00	97.50
Apr.	200.00	200.00	100.00	105.00	112.00
May	200.00	200.00	100.00	105.00	115.00
June	200.00	200.00	100.00	105.00	112.50
July	200.00	200.00	145.00	105.00	107.00
Aug.	200.00	200.00	176.00	105.00	115.00
Sept.	200.00	200.00	220.00	105.00	114.50
Oct.	200.00	200.00	212.00	105.00	112.50
Nov.	185.00	200.00	200.00	105.00	112.50
Dec.	180.00	200.00	200.00	105.00	112.50
Av.	197.08	200.00	146.50	105.83	106.91

ANTIMONY

Domestic, bulk, carlots; cents per lb, f.o.b. Laredo, Tex.

	1952	1951	1950	Yearly Averages	
Jan.	50.000	35.462	29.926	1952*	42.112
Feb.	50.000	42.000	27.318	1951	42.335
Mar.	50.000	42.000	24.600	1950	27.626
Apr.	49.077	42.000	24.500	1949	36.875
May	42.077	42.000	24.500	1948	35.010
June	39.000	42.000	24.500	1947	31.922
July	39.000	42.000	24.500	1946	15.972
Aug.	39.000	42.000	24.618	1945	14.500
Sept.	39.000	42.000	31.020	1944	14.500
Oct.	39.000	42.000	32.000	1943	14.500
Nov.	34.688	44.560	32.000	1942	14.417
Dec.	34.500	50.000	32.000	1941‡	16.500

‡ Delivered New York

SILVER

Open market, cents per fine oz., New York

	1952	1951	1950	Yearly Averages	
Jan.	88.000	88.890	73.250	1952*	84.937
Feb.	88.000	90.160	73.250	1951	89.385
Mar.	88.000	90.160	73.120	1950	74.165
Apr.	88.000	90.160	77.750	1949	71.932
May	85.356	90.160	72.635	1948	74.665
June	82.750	88.492	72.750	1947	71.959
July	82.885	90.160	72.750	1946†	80.151
Aug.	83.250	90.160	72.750	1945†	51.928
Sept.	83.250	90.160	72.750	1944†	44.750
Oct.	83.250	88.120	74.980	1943†	44.750
Nov.	83.250	88.000	80.000	1942†	38.333
Dec.*	83.250	88.000	80.000	1941†	34.783

† As reported by Handy & Harman, New York

PLATINUM

Dollars per ounce

	1952	1951	1950	1949	1948	1947
Jan.	91.50	91.50	69.50	90.00	67.50	59.90
Feb.	91.50	91.50	67.50	86.75	70.50	59.50
Mar.	91.50	91.50	67.50	77.30	73.50	59.00
Apr.	91.50	91.50	67.50	73.50	94.70	61.50
May	100.50	91.50	67.50	73.50	99.50	61.20
June	94.50	91.50	67.50	71.70	85.50	57.25
July	91.50	91.50	73.50	70.50	87.90	54.50
Aug.	91.50	91.50	78.10	70.50	94.50	57.00
Sept.	91.50	91.50	98.25	70.50	94.50	67.50
Oct.	91.50	91.50	97.50	70.50	94.50	67.50
Nov.	91.50	91.50	91.50	70.50	94.50	67.50
Dec.	91.50	91.50	91.50	70.50	93.50	67.50
Av.	92.50	91.50	78.146	74.65	87.55	61.65

* Estimated

METALWORKING FACTS AND FIGURES

COPPER PRODUCTION, SHIPMENTS AND STOCKS

DOMESTIC STATISTICS—Net Tons

Period	PRODUCTION Primary	PRODUCTION Secondary	PRODUCTION Refined	Deliveries To Customers	Refined Stocks End of Period
1952					
10 mos.	802,570	39,173	975,072	1,175,543(b)	59,760(a)
Jan.	79,777	3,415	100,269	130,430(b)	60,836(a)
Feb.	77,620	3,256	95,979	104,795(b)	59,747(a)
Mar.	83,389	3,721	94,563	112,625(b)	58,487(a)
Apr.	84,585	4,894	98,402	107,355(b)	61,223(a)
May	85,638	7,308	97,593	105,860(b)	55,351(a)
June	77,091	3,301	92,151	98,416(b)	70,856(a)
July	78,025	3,576	96,049	115,384(b)	73,657(a)
Aug.	75,457	3,911	95,366	127,910(b)	83,771(a)
Sept.	79,053	3,373	98,930	135,486(b)	71,456(a)
Oct.	81,935	2,418	105,770	136,964(b)	59,760(a)
1951	964,589	56,910	1,199,784	1,367,787	71,528
1950	940,249	117,439	1,270,768	1,371,464	49,040
1949	772,968	135,052	1,056,463	1,031,595	116,027
1948	850,088	130,410	1,233,697	1,344,445	96,080
1947	871,391	105,307	1,196,393	1,383,666	76,035
1946	618,757	32,503	604,071	1,260,921	80,832
1945	792,126	49,541	843,113	1,517,842	76,512
1944	995,938	60,242	1,098,788	1,636,295	66,780
1943	1,111,022	83,677	1,206,871	1,643,677	52,124
1942	1,098,007	54,337	1,135,708	1,635,236	65,309

FOREIGN STATISTICS—Net Tons

Period	PRODUCTION Primary	PRODUCTION Secondary	PRODUCTION Refined	Deliveries To Customers	Refined Stocks End of Period
1952					
10 mos.	1,167,968	6,656	1,008,843	849,153	143,872
Jan.	110,520	373	98,915	85,473	150,518
Feb.	109,395	1,181	95,264	84,061	154,771
Mar.	118,489	496	98,767	77,427	163,220
Apr.	115,859	281	106,689	92,391	165,495
May	119,574	290	109,673	91,547	176,772
June	129,023	346	114,421	88,676	192,603
July	119,012	622	99,201	86,345	180,392
Aug.	112,865	549	98,682	73,695	167,331
Sept.	124,230	1,184	96,511	83,784	157,450
Oct.	109,001	1,334	90,720	85,754	143,872
1951	1,378,833	5,360	1,225,018	1,013,450	152,203
1950	1,347,356	11,387	1,127,329	898,601	139,919
1949	1,270,529	10,241	1,076,114	933,641	147,972
1948	1,271,884	8,526	1,072,229	901,073	175,669

Total Domestic and Foreign

Period	PRODUCTION Primary	PRODUCTION Secondary	PRODUCTION Refined	Deliveries To Customers	Refined Stocks End of Period
1952					
10 Mos.	1,970,538	45,829	1,983,915	2,024,696	203,632
1951	2,343,422	62,270	2,424,802	2,381,237	223,731
1950	2,287,605	128,826	2,398,097	2,270,065	188,959
1949	2,043,515	145,293	2,132,577	1,965,236	263,999
1948	2,121,972	138,936	2,305,926	2,245,518	271,749

Copper Institute. Includes tonnage delivered: (a) to U. S. consumers at foreign ports; (b) from government stocks.

Imports of Copper

Unrefined, Scrap, Refined—Net Tons

	1952	1951	1950	1949	1948	1947
Jan.	49,580	45,831	56,213	48,329	36,435	26,261
Feb.	41,941	44,850	61,378	59,158	46,638	26,114
Mar.	48,272	36,062	45,207	64,790	46,981	26,291
Apr.	42,948	43,812	34,520	48,702	37,727	23,203
May	37,172	46,771	66,117	48,802	33,271	40,138
June	33,061	48,624	87,222	46,570	46,840	52,527
July	65,847	46,606	29,347	33,829	46,684	37,524
Aug.	61,111	58,969	33,576	45,372	39,736	44,185
Sept.		46,566	36,298	38,176	35,423	41,596
Oct.		42,943	62,645	37,231	36,947	44,045
Nov.		39,714	39,172	41,786	35,491	36,902
Dec.		36,021	54,807	59,054	52,222	54,513
Monthly Avg.		44,731	50,542	47,650	40,700	37,775

U. S. Bureau of the Census

Exports of Copper

Refined and Manufactured—Net Tons

	1952	1951	1950	1949	1948	1947
Jan.	10,598	8,729	12,165	21,041	18,013	14,921
Feb.	12,842	16,027	20,748	10,653	18,297	11,068
Mar.	15,303	14,457	19,021	15,415	15,043	13,467
Apr.	19,494	17,652	17,120	11,248	23,272	11,721
May	20,252	14,041	14,064	14,910	19,861	14,021
June	18,347	13,162	11,434	17,066	21,079	17,254
July	15,435	13,535	9,785	10,349	15,069	14,569
Aug.	14,604	6,714	12,230	8,695	20,623	21,606
Sept.		4,971	12,035	14,214	12,085	18,337
Oct.		9,864	11,925	9,388	17,861	19,295
Nov.		16,488	12,226	13,075	11,636	22,497
Dec.		16,599	20,905	25,049	13,725	18,299
Monthly Avg.		12,687	14,472	14,259	17,214	16,421

U. S. Bureau of the Census

Brass Ingot Shipments

Net Tons

	1952	1951	1950	1949
Jan.	28,315	28,416	18,874	19,456
Feb.	24,211	27,168	18,487	15,026
Mar.	23,890	31,967	22,494	14,550
Apr.	22,547	30,472	22,118	10,698
May	21,740	33,267	23,643	11,111
June	21,274	33,817	25,093	9,696
July	18,947	32,016	21,609	10,220
Aug.	21,807	25,285	29,689	14,194
Sept.	22,770	22,285	28,811	16,208
Oct.	25,811	23,124	32,240	18,036
Nov.		23,544	31,718	18,488
Dec.		20,987	28,757	17,960
Total		332,378	303,563	175,643

Compiled by Ingot Brass & Bronze Industry, representing in excess of 95 per cent of brass and bronze industry.

Copper Consumption in U.S.

Refined Metal—Net Tons

	1951†	1950	1949
Brass Mills	634,500	675,100	478,126
Wire Mills	705,700	713,354	623,713
Chemical Plants	3,100	3,122	1,576
Secondary Smelters	9,700	6,209	4,463
Foundries & Misc.	27,000	26,649	21,808
Total	1,380,000	1,420,000	1,129,686

† Preliminary. U. S. Bureau of Mines.

Copper and Brass Mill Fabricator Statistics

(Summary of statistics which cover United States duty-free copper until Mar. 1, 1941; duty-paid foreign copper included thereafter, beginning January, 1947, copper from all sources, duty free. Figures given in net tons.)

End of period	DELIVERIES: Deliveries to Users (actual consump)	DELIVERIES: Producer Deliveries to Fabricators	STOCKS: Fabricators' Refined Stocks	STOCKS: Less Working Stocks	STOCKS: Visible Supplies	STOCKS: Plus Undelivered Purchases	STOCKS: Total Stocks and Purchases	Unfilled Orders
1952								
10 Mos.	1,140,004	1,175,225	311,676	290,634	21,042	45,970	67,012	285,114
Jan.	131,988	130,430	267,427	294,202	−26,775	36,239	9,464	292,932
Feb.	115,150	104,795	258,279	291,475	−33,196	42,911	9,715	292,069
Mar.	116,887	112,625	254,868	292,932	−38,064	34,085	−3,979	309,835
Apr.	106,109	107,355	256,798	288,673	−31,875	39,834	−7,959	318,198
May	110,388	105,860	240,962	289,822	−48,860	41,135	−7,725	304,639
June	107,709	98,416	245,750	286,576	−40,826	39,513	−1,313	299,144
July	82,624	115,384	281,064	293,220	−12,156	53,716	41,560	303,765
Aug.	120,084	127,910	298,849	287,512	11,337	50,399	61,736	294,280
Sept.	123,740	135,486	308,036	295,275	12,761	47,188	59,949	285,465
Oct.	125,325	136,964	311,676	290,634	21,042	45,970	67,012	285,114
1951	1,394,960	1,367,787	280,402	295,385	−14,983	32,147	17,164	303,050
Jan.	226,660	108,128	268,702	290,852	−22,150	89,161	67,011	281,162
Feb.	117,853	99,485	248,593	289,712	−41,119	94,374	53,255	285,930
Mar.	113,963	116,793	252,360	290,012	−37,652	94,007	56,355	306,307
Apr.	119,172	114,744	247,002	293,265	−46,263	85,893	39,630	310,446
May	118,522	118,113	251,692	292,283	−40,591	64,397	23,806	323,454
June	129,283	114,103	237,808	291,954	−54,146	58,370	4,224	327,017
July	84,288	101,065	263,968	288,482	−24,514	50,711	26,197	343,683
Aug.	122,464	104,938	248,984	284,999	−36,015	53,500	17,485	321,198
Sept.	115,135	121,879	253,459	286,265	−32,806	47,303	14,497	321,745
Oct.	123,758	125,286	257,862	293,375	−35,513	43,281	7,668	317,285
Nov.	114,477	123,646	256,913	287,648	−30,735	36,914	6,179	311,110
Dec.	106,536	119,577	280,402	295,385	−14,983	32,147	17,164	303,050
1950	1,438,237	1,371,464	290,241	288,392	1,849	92,372	94,221	313,052
1949	1,053,225	1,031,595	354,992	285,298	69,694	82,793	152,487	189,407
1948	1,394,307	1,344,445	379,346	295,958	83,388	81,496	164,884	315,944
1947	1,338,383	1,383,666	423,432	293,859	129,573	103,765	233,338	338,260
1946	1,231,225	1,260,921	411,013	286,418	124,595	59,421	184,016	526,648
1945	1,462,440	1,517,842	375,618	268,490	107,128	44,100	151,228	362,436
1944	1,656,052	1,636,295	334,017	289,160	44,857	53,538	98,395	285,654
1943	1,701,753	1,643,955	353,948	299,796	54,152	90,807	144,959	465,258
1942	1,517,983	1,635,236	414,668	340,547	74,121	135,481	209,602	613,005
1941	1,577,765	1,545,541	295,813	291,515	4,298	241,335	245,633	547,468
1940	959,607	1,001,886	339,376	240,740	98,636	326,269	424,905	414,892
1939	793,399	814,407	300,543	184,833	115,710	189,687	305,397	237,752

METALWORKING FACTS AND FIGURES

Slab Zinc

Net Tons

(Commencing with January, 1948, all regularly operating United States primary and secondary smelters are included. Production from foreign ores is included commencing with 1940.)

	Stock Beginning	Production	SHIPMENTS Domestic	SHIPMENTS Export & Drawback	SHIPMENTS Gov't. Acc't.	SHIPMENTS Total	Unfilled Orders at End
1952*	21,901	962,000	809,000	54,500	36,500	900,000	35,000
Jan.	21,901	83,205	75,039	1,782	1,582	78,403	55,760
Feb.	26,703	77,296	70,928	4,882	1,638	77,448	70,442
Mar.	26,551	85,028	80,121	5,051	403	85,575	66,620
Apr.	26,004	83,011	73,818	8,021	3,753	85,592	56,838
May	23,423	83,797	63,457	5,258	4,950	74,076	41,494
June	33,144	77,463	36,894	6,632	3,739	47,265	39,428
July	63,342	76,930	38,824	3,036	1,493	43,353	45,547
Aug.	96,919	78,167	72,963	4,091	1,381	78,435	44,522
Sept.	96,651	76,619	69,343	3,654	5,132	78,129	42,791
Oct.	94,541	80,588	76,420	3,827	4,301	84,548	37,533
1951	8,884	931,833	836,800	42,067	39,949	918,816	50,909
1950	94,221	910,354	849,255	18,189	128,256	995,700	74,795
1949	20,848	870,113	648,285	56,929	91,526	796,740	42,625
1948	68,647	850,105	770,396	69,910	57,598	898,154	51,318
1947	175,800	848,027	698,281	117,305	140,230	955,816	59,705
1946	259,391	759,346	714,292	66,638	62,007	842,937	58,057
1945	237,520	799,520	762,925	9,422	5,302	777,649	27,092
1944	173,510	901,332	830,334	6,988	.....	837,322	21,332
1943	89,275	971,873	831,430	56,208	.....	887,638	44,914
1942	24,066	929,770	733,918	151,650	.....	885,568	52,752
1941	17,582	863,955	751,276	106,195	.....	857,471	87,666
1940	74,262	706,100	674,615	88,165	.....	762,780	125,132
1939	126,769	538,198	598,972	.....	.....	598,972	53,751
1938	65,333	456,990	395,534	20	.....	395,554	40,829
1937	44,955	589,619	569,241	.....	.....	569,241	48,339
1936	83,758	523,166	561,969	.....	.....	561,969	78,626
1935	118,005	431,499	465,687	59	.....	465,746	51,186
1934	105,560	366,933	352,515	148	.....	352,663	30,786
1933	124,856	324,705	343,762	239	.....	344,001	15,978
1932	129,842	213,531	218,347	170	.....	218,517	8,478
1931	143,618	300,738	314,473	41	.....	314,514	18,273
1930	75,430	504,463	436,079	196	.....	436,275	26,651

American Zinc Institute Inc

* Estimated

U. S. Lead

Refiners' Stocks, Production, Shipments

Net Tons

	Stock at Beginning	Production (Inc. Secondary)	Total Supply	Domestic Shipments
1952*	25,339	515,000	540,339	505,000
Jan.	25,339	43,746	69,085	40,390
Feb.	28,578	44,133	72,711	41,291
Mar.	31,297	48,943	80,240	39,161
Apr.	41,040	39,329	80,369	38,225
May	41,820	45,546	87,366	28,591
June	58,775	38,987	97,762	39,563
July	58,190	37,489	95,679	51,534
Aug.	44,140	41,836	85,976	45,499
Sept.	39,767	42,791	82,558	49,850
Oct.	31,837	51,521	83,358	43,150
1951	35,619	486,874	522,493	496,184
1950	70,424	571,763	642,187	499,637
1949	38,644	542,676	581,320	355,905
1948	21,328	511,356	532,684	490,630
1947	47,587	541,065	588,652	566,666
1946	44,867	396,688	441,555	393,904
1945	19,536	524,328	543,864	500,003
1944	33,090	538,618	571,708	552,063
1943	34,937	546,673	581,610	548,417
1942	20,185	633,818	654,003	618,947
1941	40,926	634,888	675,814	655,542
1940	58,777	685,480	644,257	603,143
1939	115,902	497,991	613,893	555,074
1938	129,131	408,539	537,570	421,625
1937	171,856	533,215	705,071	575,933
1936	222,306	463,006	685,312	513,361
1935	234,030	421,764	655,794	433,456
1934	203,061	412,298	615,359	379,807
1933	176,157	374,153	550,310	347,156
1932	151,653	342,137	493,790	317,261
1931	103,247	478,591	581,838	429,949

American Bureau of Metal Statistics

* Estimated

Mine Production of Zinc

Net Tons

	1952	1951	1950	1949	1948
Jan.	59,523	59,651	43,606	51,656	48,068
Feb.	59,098	56,878	46,030	52,963	48,241
Mar.	61,292	60,670	51,692	62,049	54,989
Apr.	60,443	56,467	49,183	59,185	53,425
May	63,017	58,233	52,111	55,925	51,927
June	58,063	56,473	50,625	54,271	51,755
July	50,231	53,379	48,423	40,256	47,095
Aug.	49,402	54,403	56,221	45,068	49,748
Sept.	47,729	50,089	54,794	41,887	52,581
Oct.		60,004	55,791	38,823	53,542
Nov.		57,195	54,604	40,112	55,005
Dec.		57,269	55,127	41,687	55,141
Mo. Avg.		55,960	51,517	48,657	52,498

U. S. Bureau of Mines

Mine Production of Lead

Net Tons

	1952	1951	1950	1949	1948
Jan.	34,381	35,181	35,640	33,010	33,144
Feb.	34,337	33,870	34,825	32,562	32,399
Mar.	33,662	37,096	35,066	39,714	35,889
Apr.	34,363	33,587	35,558	36,979	35,111
May	33,567	34,006	38,021	36,731	33,268
June	31,702	32,681	36,957	36,065	34,521
July	29,849	30,491	31,398	29,778	23,391
Aug.	30,249	29,872	36,030	33,832	23,551
Sept.	29,810	27,653	35,104	30,549	26,910
Oct.		33,133	35,731	29,734	35,337
Nov.		33,326	35,377	31,186	36,504
Dec.		33,499	36,175	33,868	36,997
Mo. Avg.		32,347	35,902	34,159	32,540

U. S. Bureau of Mines

Standard Specifications for Slab Zinc

Grade	Maximum Per Cent Pb	Maximum Per Cent Fe	Maximum Per Cent Cd	Sum of Pb, Fe, Cd
Special High Grade*	0.006	0.005	0.004	0.01
High Grade*	0.07	0.02	0.07	0.10
Intermediate*	0.20	0.03	0.50	0.50
Brass Special*	0.60	0.03	0.50	1.00
Select*	0.80	0.04	0.75	1.25
Prime Western	1.60	0.08		

*No aluminum allowed

CONSUMPTION OF SLAB ZINC IN U.S.

Net Tons

	Galvanizing	Brass & Bronze Ingots	Rolled Zinc	Zinc-Base Alloys	Miscellaneous	Total
1952						
Jan.	32,938	15,434	4,869	24,478	2,812	80,531
Feb.	32,707	13,241	4,662	20,389	2,712	73,711
Mar.	34,804	12,020	3,666	18,820	2,660	71,970
Apr.	32,030	11,437	4,281	18,069	2,704	68,521
May	32,959	11,025	3,797	17,420	2,793	67,994
June	12,215	10,307	3,593	15,007	2,190	43,312
July	12,160	8,137	3,339	13,422	1,817	38,875
Aug.	34,840	11,782	4,814	17,314	1,859	70,609
Sept.	37,394	13,682	4,478	21,178	2,097	78,829
1951	386,373	141,456	64,000	266,442	28,738	887,009
1950	441,686	139,373	68,444	289,527	28,104	967,134
1949	350,880	85,534	55,200	202,181	18,046	711,841
1948	370,969	109,140	76,672	234,628	26,326	817,735
1947	361,327	112,347	70,680	214,469	27,537	786,360

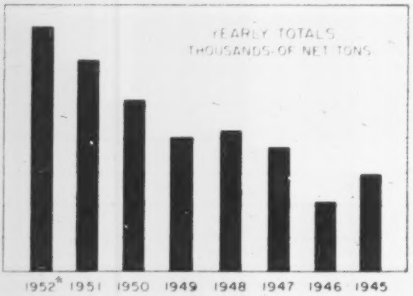
CONSUMPTION OF LEAD IN U.S.—1951-52

Net Tons

Metal Products	Total 1951	1952 Jan.	Feb.	Mar.	Apr.	May	June	July
Ammunition	40,242	2,259	2,224	1,964	2,442	2,415	2,166	1,972
Bearing Metals	35,410	3,369	3,294	3,011	3,008	2,709	2,506	2,556
Brass & Bronze	29,858	1,920	1,684	2,074	1,833	1,771	1,562	1,335
Cable Covering	131,863	12,428	11,536	12,767	12,641	12,058	11,926	7,099
Calking Lead	46,544	4,410	5,050	4,237	2,474	2,135	3,350	4,282
Casting Metals	22,497	1,623	1,799	1,592	1,756	2,030	1,578	1,575
Collapsible Tubes	13,657	935	742	782	938	698	941	715
Foil	2,881	187	200	100	161	152	115	279
Pipes, Traps & Bends	33,095	2,638	2,889	2,472	2,267	2,080	2,525	2,461
Sheet Lead	31,210	2,402	2,941	2,522	1,995	1,812	2,259	2,516
Solder	82,465	5,560	5,998	5,789	5,595	5,575	5,617	5,561
Storage Batteries								
Antimonial Lead	199,838	16,024	13,302	11,671	10,740	12,813	13,892	16,048
Oxides	175,546	13,897	12,147	9,660	10,812	9,919	12,377	13,398
Terne Metal	2,051	83	253	168	144	79	69	114
Type Metal	28,236	2,252	2,075	2,435	2,553	2,501	2,005	2,118
Total Metal Products	875,393	69,987	66,134	61,244	59,359	58,747	62,888	62,029
Pigments	139,504	11,659	12,035	12,754	10,011	8,642	10,377	11,273
Chemicals	135,356	12,509	11,184	12,010	12,275	13,166	12,280	10,097
Miscellaneous Uses	34,540	2,548	2,524	2,693	2,113	2,250	1,613	1,801
Total consumed	1,184,793	96,703	91,877	88,701	83,758	82,805	87,158	85,200

U. S. Bureau of Mines

PRIMARY ALUMINUM PRODUCTION



1952-1946 By Months—Net Tons

	1952	1951	1950	1949	1948	1947	1946
Jan.	76,934	67,954	52,023	53,356	48,767	50,045	24,750
Feb.	72,330	62,740	50,443	49,749	45,699	47,002	22,250
Mar.	77,069	70,022	58,747	54,852	51,874	53,032	26,000
Apr.	76,880	67,701	58,024	54,076	53,277	51,007	25,900
May	80,803	67,720	61,929	56,909	55,450	51,116	24,850
June	77,476	67,454	60,400	54,184	48,557	46,259	27,800
July	78,368	72,698	63,518	55,777	52,937	47,998	35,750
Aug.	85,175	73,816	63,006	52,001	54,953	47,054	39,850
Sept.	76,882	69,429	59,449	49,742	53,255	43,228	41,100
Oct.	.....	72,647	62,915	45,790	54,526	43,959	45,000
Nov.	.....	72,246	62,276	35,865	50,714	43,461	46,300
Dec.	.....	72,454	65,897	41,161	53,474	47,589	50,700
Total	940,000*	836,881	718,627	603,462	623,456	571,750	409,630

Yearly totals reflect adjustments and in some instances vary slightly from the sums of monthly figures. * Estimated. U. S. Bureau of Mines

Secondary Aluminum Production

Net Tons

	From New Scrap	From Old Scrap	Total	As Metal	As Alloys†
1951	207,758	70,906	278,664	N.A.	N.A.
1950	167,308	76,358	243,666	2,140	241,526
1949	136,166	44,569	180,762	343	180,419
1948	191,129	95,648	286,777	2,384	284,393
1947	150,990	163,847	314,837	5,105	339,732
1946	187,538	90,535	278,073	2,075	275,998
1945	271,076	27,311	298,387	2,145	296,242
1944	302,746	22,899	325,645	2,336	323,309
1943	280,867	33,094	313,961	5,926	308,035
1942	154,851	41,633	198,492	14,104	184,388
1939	16,184	37,763	53,947	2,900	51,047

† May include chemical compounds.
U. S. Bureau of Mines N.A.—Not available

Bauxite Production and Imports

Long Tons. Quarterly figures are preliminary and their sums differ slightly from final annual totals.

	—Mine Production (dried equiv.)— Arkansas	Ala., Ga., Va.	Total	Imports as Shipped	Total New Supply
1952					
1st Qtr	411,858	14,411	426,269	848,689	1,274,918
2nd Qtr	442,656	15,956	458,612	729,952	1,188,564
1951	1,815,274	33,402	1,848,676	2,829,929	4,678,605
1st Qtr	372,055	9,477	381,532	686,981	1,068,513
2nd Qtr	501,536	4,568	506,104	676,547	1,182,651
3rd Qtr	450,553	6,825	457,378	747,554	1,204,932
4th Qtr	507,162	11,900	519,062	718,847	1,237,909
1950	1,307,335	27,192	1,334,527	2,508,970	3,843,497
1st Qtr	N.A.	N.A.	325,025	628,301	953,326
2nd Qtr	N.A.	N.A.	371,708	651,329	1,023,037
3rd Qtr	288,220	8,258	296,478	626,074	922,552
4th Qtr	345,834	7,994	353,828	603,266	957,094
1949	1,094,924	53,868	1,148,792	2,688,164	3,836,956
1st Qtr	303,048	14,690	317,738	602,134	919,872
2nd Qtr	279,051	12,553	291,604	625,772	917,376
3rd Qtr	194,066	12,441	206,507	704,876	911,383
4th Qtr	305,943	17,323	323,266	755,382	1,078,648
1948	1,395,341	61,807	1,457,148	2,488,915	3,946,063
1947	1,153,563	48,492	1,202,055	1,821,580	3,023,635
1946	1,019,118	53,707	1,072,825	852,005	1,924,830
1945	910,049	70,960	981,009	739,581	1,720,590
1944	2,695,317	128,407	2,823,724	560,461	3,384,185

† Includes Mississippi. N.A. "Not available." U. S. Bureau of Mines

Aluminum Wrought Products

Producers' Shipments, Thousands of Pounds

Period	Total	Plate, Sheet, and Strip	Rolled Structural Shapes, Rod, Bar, Wire	Extruded Shapes, Tube Blooms, and Tubing	Powder, Flake, and Paste
1952*	1,860,000	1,000,000	475,000	335,000	50,000
January	149,143	81,286	34,778	30,534	2,545
February	146,306	78,660	38,239	25,168	4,239
March	153,641	82,869	41,531	25,476	3,765
April	159,855	85,104	43,267	27,171	4,313
May	157,784	86,519	41,784	25,462	4,019
June	155,549	87,697	36,762	26,878	4,212
July	148,740	86,054	33,435	24,908	4,343
August	159,559	92,163	33,770	29,136	4,490
September	165,728	95,828	35,974	30,242	3,684
1951	1,756,244	1,073,367	345,163	312,944	24,770
January	167,793	113,080	26,819	25,512	2,382
February	144,388	94,761	24,065	23,596	2,026
March	164,435	101,021	29,938	31,181	2,295
April	151,965	94,715	28,714	26,569	1,967
May	144,987	91,821	25,315	25,840	2,011
June	146,381	88,552	28,758	26,972	2,099
July	132,406	82,715	25,908	22,015	1,768
August	152,027	91,512	29,831	28,786	1,898
September	129,167	77,464	26,873	22,962	1,868
October	144,135	82,547	31,884	27,662	1,942
November	139,176	78,836	32,319	25,851	2,170
December	134,290	75,510	34,678	21,668	2,434
1950	1,713,449	1,163,135	269,780	258,075	22,459
1949	1,158,146	790,025	203,650	149,995	14,476
1948	1,640,186	1,268,297	182,991	174,944	16,954

U. S. Bureau of the Census * Estimated

Antimony Imports

Metal imported for consumption in United States. Net Tons

Year	—Antimony Ore— Gross Weight	Sb Content	Needle or Liquidated Cb	Antimony Metal	Type Metal and Antimonial Lead†
1951	27,354	11,905	6	2,231	676
1950	22,307	9,746	19	4,632	1,936
1949	17,855	7,473	81	1,853	654
1948	41,610	13,464	533	3,201	1,569
1947	28,471	9,257	17	5,879	187
1946	19,741	5,903	....	2,593	246

U. S. Department of Commerce † Estimated antimony content

Magnesium Wrought Products

Shipments, Thousands of Pounds

	1952	1951	1950	1949	1948	1947
Jan	1,635	1,522	952	581	314	700
Feb	1,748	1,189	761	636	413	752
Mar	1,712	1,889	868	672	460	588
Apr	1,745	1,531	998	537	516	499
May	1,804	1,716	850	756	418	420
June	1,428	1,643	1,198	752	526	290
July	1,398	1,394	1,177	748	205	265
Aug	1,444	1,497	1,103	671	497	253
Sept		1,461	1,011	724	707	247
Oct		1,773	1,269	793	519	299
Nov		1,645	1,305	622	532	269
Dec		1,533	1,318	752	728	275
Year		19,090	12,810	8,264	5,865	4,807

U. S. Bureau of Mines

Antimony Production

Domestic mine production of ores and concentrates, Net Tons

Year	Gross Weight	—Antimony Content— Quantity	Average Per Cent
1951†	10,000	3,512	35.1
1950	6,888	2,497	36.3
1949	5,260	1,636	31.1
1948	16,239	6,489	40.0
1947	20,020	5,316	26.6
1946	13,962	2,505	17.9

U. S. Bureau of Mines † Preliminary

Antimony Consumption

Industrial use of primary antimony. Net Tons

PRODUCTS	1951	1950	1949	1948
Ammunition	4	9	6	21
Antimonial Lead & Battery Metal	5,205	4,912	4,737	6,024
Bearing Metal and Bearings	1,308	3,256	873	1,803
Cable Covering	95	72	172	62
Castings	79	126	49	81
Collapsible Tubes and Foil	18	23	14	31
Sheet and Pipe	180	....	306	195
Solder	123	300	155	145
Type Metal	709	162	587	1,019
Nonmetal Products	9,798	5,868	4,631	6,074
Total	17,519	15,494	11,530	15,455

U. S. Bureau of Mines

Nonferrous Metals

U. S. Tin Imports

Ore (Tin Content), and Metal (Bars, Blocks, Pigs, etc.) in Long Tons

	Ore	Metal
1952		
Jan.	144	1,005
Feb	1,472	598
Mar.	821	7,752
Apr.	732	10,894
May	934	7,418
June	3,070	9,951
July	5,481	6,619
Aug.	2,378	8,501
1951		
Jan.	4,545	5,741
Feb.	2,927	2,213
Mar.	2,753	4,405
Apr.	2,204	2,273
May	1,334	1,203
June	2,924	1,868
July	2,663	2,321
Aug.	2,430	1,172
Sept.	591	1,865
Oct.	4,545	1,969
Nov.	643	1,188
Dec.	1,820	1,591
MONTHLY AVERAGES		
1951	2,469	2,315
1950	2,169	6,910
1949	3,193	5,019
1948	3,124	4,080
1947	2,364	2,810
1946	3,178	558
1945	2,790	781
1944	2,962	1,112
1943	1,821	993
1942	2,411	2,229

International Tin Study Group

U. S. Silver Output

(Thousands of ounces; commercial bars, 0.999 fine, and other refined forms.)

	From Domestic Ore†	From Foreign Ore	Total
1952*	40,200	37,000	77,200
Jan.	3,766	4,217	7,983
Feb.	3,430	2,532	5,962
Mar.	3,854	2,678	6,532
Apr.	4,043	3,292	7,335
May	3,273	2,045	5,318
June	3,292	2,751	6,043
July	3,307	3,793	7,100
Aug.	2,272	3,525	5,797
Sept.	3,235	3,004	6,239
1951	39,967	33,837	73,804
Jan.	3,769	3,523	7,292
Feb.	3,374	3,088	6,462
Mar.	4,371	3,701	8,072
Apr.	3,429	2,734	6,163
May	3,482	4,078	7,560
June	3,932	2,168	6,100
July	2,758	2,233	4,991
Aug.	2,835	2,185	5,020
Sept.	2,585	2,170	4,755
Oct.	3,079	3,010	6,089
Nov.	3,134	2,907	6,041
Dec.	3,219	2,040	5,259
1950	42,068	37,656	79,724
1949	34,559	28,226	62,785
1948	36,111	37,680	73,791
1947	36,053	39,645	75,698
1946	21,377	30,371	51,748
1945	29,332	38,786	68,118
1944	37,370	39,341	76,711

† Includes purchases of crude silver by the United States Mint

American Bureau of Metal Statistics

U. S. Tin Consumption

Long Tons

	Consumption Primary	Consumption Secondary	Consumption Total	Stocks
1952*	46,000	30,000	70,000	45,000
Jan.	4,879	2,399	7,278	26,672
Feb.	4,524	2,372	6,896	23,694
Mar.	4,489	2,475	6,964	27,479
Apr.	3,919	2,546	6,465	38,751
May	3,751	2,096	5,847	43,703
June	1,789	1,958	3,747	43,341
1951	59,948	28,004	87,952	31,532
1950	71,191	33,273	104,464	63,486
1949	47,163	25,243	72,406	59,813
1948	59,863	30,925	90,788	63,517
1947	59,166	28,934	88,100	68,728
1946	54,627	26,316	80,943	60,585
1945	55,642	27,941	83,583	71,408
1944	59,156	30,813	89,969	89,914
1943	46,253	34,077	80,330	105,784
1942	56,288	29,399	85,687	127,797
1941	103,086	31,609	134,695	146,888
1940	72,324	24,830	97,154	92,770
1939	66,583	15,845	82,428	37,076

International Tin Study Group; U. S. Bureau of Mines.

Nickel Production

Net Tons

	Canada	Other Countries	Estimated Total
1952*	148,000	20,000	168,000
1951	137,031	20,069	157,100
1950	123,659	32,841	156,500
1949	128,689	32,311	161,000
1948	131,740	34,260	166,000
1947	118,627	35,373	153,000
1946	96,062	39,938	136,000
1945	122,565	37,435	160,000
1944	137,299	35,701	173,000
1943	144,009	40,091	184,100
1942	142,606	31,594	174,200
1941	141,129	37,471	178,600
1940	122,779	31,521	154,300
1939	113,053	21,447	134,500
1938	105,286	22,014	127,300
1937	112,453	19,947	132,400
1936	84,870	18,080	102,950
1935	69,258	16,042	85,300
1934	64,344	14,556	78,900

U. S. Bureau of Mines; Dominion Bureau of Statistics; STEEL

Tungsten

U. S. Mines—Pounds

1952	Production	Shipments
1st Qtr.	1,508,476	1,541,787
2nd Qtr.	1,724,199	1,646,475
1951	5,913,750*	5,972,551*
1st Qtr.	1,335,580	1,243,581
2nd Qtr.	1,427,580	1,576,683
3rd Qtr.	1,483,097	1,521,166
4th Qtr.	1,622,683	1,586,200
1950	3,965,040	4,587,687
1949	2,896,084	2,631,506
1948	4,033,389	3,838,287
1947	3,026,470	2,944,622
1946	4,671,042	4,942,282
1945	5,388,639	5,266,818

U. S. Bureau of Mines

* Revised; not allocated quarterly

U. S. Tin Smelter Output

Long Tons

	1952	1951	1950	1949	1948
Jan.	1,802	3,211	2,627	3,257	3,172
Feb.	1,800	3,096	2,362	3,254	2,800
Mar.	1,800	3,036	2,729	3,104	2,602
Apr.	1,800	3,058	2,484	2,851	2,906
May	1,800	3,059	2,852	3,007	3,310
June	0	2,655	2,204	3,006	3,650
July	0	2,406	2,256	2,910	3,509
Aug.	0	2,595	2,396	3,005	3,509
Sept.	2,450	2,155	2,805	2,910	2,859
Oct.	3,364	2,091	3,209	2,964	2,300
Nov.	4,020	1,806	3,207	2,994	2,907
Dec.	....	1,805	3,005	2,791	3,153
Total	23,000*	30,883	32,136	36,053	36,677

Office of Domestic Commerce *Estimated

World Tin

Long Tons

	Production	Consumption	Stocks
1952*	155,000	120,000	130,000
Jan.	13,500	11,600	99,800
Feb.	12,200	10,900	99,200
Mar.	14,800	10,600	107,600
Apr.	13,000	10,300	110,400
May	13,600	9,700	111,500
June	12,300	7,700	116,400
July	11,400	8,100	119,000
Aug.	13,000	9,600	122,000
1951	167,500	137,000	99,300
1950	173,500	148,000	118,200
1949	168,000	114,500	130,800
1948	157,500	131,000	133,100
1947	124,500	127,000	135,200
1946	99,500	114,500	153,000
1945	89,400	97,500	170,900
1944	93,700	100,500	156,500
1943	108,500	90,500	166,100
1942	101,500	112,500	171,900

International Tin Study Group. Figures are partly estimated and include substantial revisions from previously reported totals.

Molybdenum Products

Comprises ferromolybdenum, molybdic oxide, and molybdenum salts and metal

Pounds

	Production	Shipments†	Stocks
1952			
1st Qtr.	7,890,900	8,045,800	2,882,300
2nd Qtr.	7,942,000	7,112,200	3,712,200
1951	32,775,000	31,232,700	3,037,200
1st Qtr.	8,692,800	7,727,800	2,459,900
2nd Qtr.	7,734,800	7,935,100	2,259,600
3rd Qtr.	8,057,700	7,437,500	2,879,700
4th Qtr.	8,289,700	8,132,200	3,037,200
1950	25,347,800	34,690,800	1,494,900
1st Qtr.	5,507,900	5,695,100	10,650,700
2nd Qtr.	5,418,600	6,383,500	9,685,800
3rd Qtr.	6,325,800	8,570,500	7,441,100
4th Qtr.	8,095,500	14,041,700	1,494,900
1949	19,624,200	16,333,100	10,837,900
1948	24,445,300	25,024,700	7,546,800
1947	20,659,700	20,744,900	8,126,200

† Including exports

U. S. Bureau of Mines

Manganese

(Supplies for United States Consumption, net tons.)

	Domestic Mine Shipments	General Imports Ore	General Imports Ferro-manganese†	Exports Ore	Exports Ferro-manganese†	Net Supply
1952*	109,000	2,000,000	140,000	6,500	750	2,241,750
Jan.	8,700	201,405	14,300	412	18	223,975
Feb.	8,700	174,475	16,218	374	40	198,979
Mar.	8,700	193,537	20,254	685	70	221,736
Apr.	8,600	231,857	10,100	836	74	249,617
May	9,600	226,405	9,434	620	32	244,787
1951	101,900	1,765,187	240,980	8,029	1,267	2,098,771
1950	139,000	1,837,950	221,684	8,962	1,160	2,188,512
1949	126,100	1,544,526	130,028	5,033	13,254	1,782,367
1948	131,100	1,256,597	195,360	9,236	39,175	1,534,646
1947	131,627	1,541,818	156,760	10,075	38,884	1,781,246

† Expressed in terms of ore * Estimated U. S. Bureau of Mines

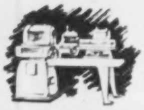
Molybdenum Concentrates

Pounds

	Production	Shipments†	Consumption	Stocks
1952				
1st Qtr.	8,905,700	10,382,400	7,991,200	3,971,800
2nd Qtr.	10,253,200	9,492,100	7,995,900	5,415,700
1951	38,855,000	37,955,000	33,691,000	5,057,900
1st Qtr.	9,672,700	9,457,300	8,987,300	3,908,600
2nd Qtr.	9,849,500	8,070,400	7,810,600	5,837,600
3rd Qtr.	9,787,700	9,825,300	8,297,100	6,065,000
4th Qtr.	9,592,500	10,421,700	8,596,100	5,067,700
1950	28,480,000	44,544,000	26,029,000	4,089,800
1949	22,529,800	23,280,400	19,560,000	19,159,100
1948	26,706,000	29,669,000	25,156,000	21,205,800

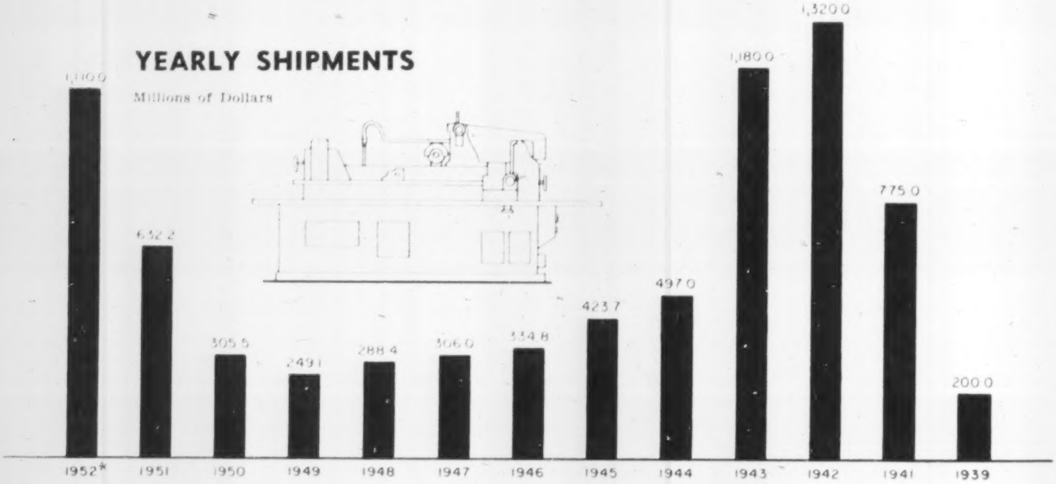
† Including exports, plus concentrates converted to oxide at Miami, Ariz., and Langeloth, Pa.

U. S. Bureau of Mines



Machine Tools

METALWORKING FACTS AND FIGURES



YEARLY SHIPMENTS

Millions of Dollars

INDEX OF MACHINE TOOL NEW ORDERS

Base: Average Shipments in 1945-46-47=100%

TOTAL NEW ORDERS (DOMESTIC AND FOREIGN)

	1952	1951	1950	1949	1948	1947	1946	1945	1944	1943	1942	1941	1939
Jan	347.8	475.4	99.7	87.0	83.1	71.7	115.6	208.9	100.6	222.8	378.7	260.4	49.0
Feb	318.8	615.3	89.2	80.9	77.3	63.8	79.8	205.4	118.9	270.4	471.1	244.5	51.7
Mar	324.3	590.3	107.4	93.5	86.3	74.3	106.3	181.8	143.9	348.6	1,164.5	236.4	57.5
Apr	293.5	516.1	98.9	70.1	86.3	69.8	123.4	172.4	194.7	245.4	902.1	215.8	48.7
May	284.6	483.0	116.4	63.7	73.5	76.9	107.9	154.8	207.2	212.9	639.9	219.8	69.0
June	342.9	558.8	124.1	53.6	83.4	90.9	109.1	123.3	182.3	176.6	563.7	281.7	68.3
July	376.3	490.6	253.1	48.0	74.0	81.1	99.0	100.3	121.6	140.2	477.3	313.2	73.0
Aug	311.1	488.9	305.1	51.5	73.7	62.1	99.9	103.1	147.0	136.2	392.1	325.0	64.6
Sept	302.4	380.2	280.6	57.7	73.1	63.7	86.4	85.8	125.5	125.5	331.2	304.7	119.4
Oct	243.7	403.9	289.6	56.8	67.4	81.0	85.3	99.3	206.6	118.1	308.8	269.2	160.0
Nov		330.5	291.9	84.3	72.2	75.6	73.2	89.1	210.6	127.2	343.9	322.3	174.2
Dec		376.5	410.1	82.5	76.7	81.1	72.7	119.4	221.2	114.1	265.5	383.3	264.5
Avg		475.8	205.5	69.1	77.2	74.3	96.5	137.0	165.0	186.5	519.9	281.4	100.0

DOMESTIC

	1952	1951	1950	1949	1948	1947	1946
Jan	314.2	414.1	73.0	65.1	69.1	50.7	71.3
Feb	304.4	537.3	70.4	54.4	64.6	48.0	55.8
Mar	301.0	488.2	82.5	71.2	70.2	54.2	79.5
Apr	277.9	450.0	81.5	47.0	72.2	51.0	98.1
May	253.2	447.3	98.0	47.9	62.1	60.6	83.8
June	322.6	502.4	101.1	37.9	71.5	73.7	73.4
July	361.4	435.7	230.8	34.0	60.7	64.4	69.7
Aug	288.4	430.2	270.9	32.7	60.1	47.5	77.5
Sept	279.3	353.2	253.4	44.0	61.5	49.0	68.1
Oct	221.2	362.8	240.1	43.1	53.4	65.0	63.2
Nov		301.5	265.3	67.3	54.1	64.1	48.7
Dec		358.2	297.3	60.1	60.5	66.3	50.9
Avg		423.4	172.0	50.4	63.3	57.9	70.0

FOREIGN

	1952	1951	1950	1949	1948	1947	1946
Jan.	33.6	61.3	26.7	21.9	14.0	21.0	44.3
Feb.	14.4	78.2	18.8	26.5	12.7	15.8	24.0
Mar.	23.3	102.1	24.9	22.3	16.1	20.1	26.8
Apr.	15.6	66.1	17.4	23.1	14.1	18.8	25.3
May	31.4	35.7	18.4	15.8	11.4	16.3	24.1
June	20.3	56.4	23.0	15.7	11.9	17.2	35.7
July	14.9	54.9	22.3	14.0	13.3	16.7	29.3
Aug.	22.7	58.7	34.2	18.8	13.6	14.6	22.4
Sept.	23.1	27.0	27.2	13.7	11.6	14.7	18.3
Oct.	22.5	41.1	49.5	13.7	14.0	16.0	22.1
Nov.		29.0	26.6	17.0	18.1	11.5	24.5
Dec.		18.3	112.8	22.4	16.2	14.8	21.8
Avg		52.4	33.5	18.7	13.9	16.4	26.5

National Machine Tool Builders' Association

* Estimated

Machine Tools

METALWORKING FACTS AND FIGURES

INDEX OF MACHINE TOOL SHIPMENTS

Base: Average Shipments in 1945-46-47=100%

	1952	1951	1950	1949	1948	1947	1946	1945	1944	1943	1942	1941	1939
Jan.	266.6	114.3	52.8	68.8	75.3	91.7	105.9	130.0	190.6	297.0	282.5	171.5	36.2
Feb.	279.6	123.8	56.1	70.3	87.1	92.4	94.2	125.9	169.6	387.5	285.5	185.0	39.9
Mar.	299.5	158.9	75.3	75.8	83.6	100.4	95.2	140.4	175.5	424.2	332.6	194.1	48.4
Apr.	307.9	157.7	61.6	74.7	82.0	93.3	99.0	142.6	139.9	399.1	349.6	203.9	47.3
May	323.0	175.1	82.5	72.8	82.6	89.2	94.2	140.5	141.4	385.1	362.9	205.6	52.8
June	330.8	182.8	91.9	79.0	94.4	84.1	99.8	146.0	140.2	367.7	375.7	214.4	57.5
July	259.7	144.7	68.3	60.7	62.4	65.4	78.3	115.4	110.8	329.9	384.2	195.8	46.7
Aug.	317.0	178.9	95.7	67.3	69.8	63.6	92.5	113.1	119.0	296.9	396.8	217.5	56.8
Sept. ...	368.3	189.8	101.6	67.6	84.7	77.0	87.5	96.3	121.4	290.3	405.4	232.3	60.9
Oct.	357.6	221.3	100.9	62.3	80.4	94.8	99.9	109.5	126.9	264.8	439.7	251.1	71.7
Nov.	....	226.0	110.9	67.6	76.2	84.7	90.4	91.6	122.7	243.0	408.8	252.3	75.4
Dec.	....	264.7	135.7	75.7	96.9	98.4	95.2	81.7	128.8	205.7	446.3	287.5	82.9
Avg. ..	....	178.2	86.1	70.2	81.3	86.2	94.3	119.4	140.6	324.3	372.5	218.4	56.4

National Machine Tool Builders' Association

PRODUCERS' SHIPMENTS OF MACHINE TOOLS

Dollar Value and Number of Units

CLASSES OF MACHINE TOOLS	1951 Dollar Value and No. Units	1950 Dollar Value and No. Units	1949 Dollar Value and No. Units	1948 Dollar Value and No. Units	1947 Dollar Value and No. Units	1942 Dollar Value and No. Units
Boring Machines	$75,068,000 2,518 Units	$29,402,000 1,363 Units	$29,430,000 1,212 Units	$24,098,000 1,268 Units	$25,825,000 1,444 Units	$137,472,000 9,697 Units
Broaching Machines	11,975,000 681 Units	4,883,000 374 Units	3,411,000 290 Units	3,779,000 343 Units	4,956,000 532 Units	9,022,000 1,007 Units
Drilling Machines	70,916,000 19,257 Units	33,129,000 9,917 Units	25,271,000 6,305 Units	32,816,000 10,125 Units	33,517,000 n.a.	103,726,000 47,654 Units
Gear-cutting and Finishing Machines	38,336,000 2,452 Units	19,819,000 1,402 Units	14,231,000 1,095 Units	16,407,000 1,367 Units	17,719,000 1,682 Units	51,864,000 6,435 Units
Grinding and Polishing Machines (except gear-tooth grinding, honing, lapping, polishing and buffing machines)	121,115,000 109,782 Units	60,859,000 79,274 Units	45,660,000 64,257 Units	47,294,000 98,792 Units	56,364,000 n.a.	209,345,000 54,009 Units
Lathes	170,529,000 43,107 Units	89,716,000 30,251 Units	62,289,000 18,631 Units	81,106,000 29,322 Units	92,908,000 n.a.	455,250,000 88,878 Units
Milling Machines	70,257,000 11,287 Units	36,452,000 6,975 Units	31,400,000 4,397 Units	34,914,000 6,064 Units	35,278,000 7,504 Units	246,223,000 47,565 Units
Planers	5,966,000 111 Units	3,035,000 84 Units	3,699,000 99 Units	4,828,000 157 Units	4,018,000 152 Units	29,931,000 981 Units
Shapers (except gear shapers)	6,095,000 1,096 Units	3,397,000 794 Units	2,831,000 666 Units	5,826,000 1,369 Units	6,880,000 1,787 Units	n.a. n.a.
All Other Machine Tools	59,465,000 n.a.	35,051,000 n.a.	23,148,000 n.a.	26,453,000 n.a.	44,891,000 n.a.	78,915,000 50,960 Units
Total Machine Tools	$629,722,000 n.a.	$315,743,000 n.a.	$241,370,000 n.a.	$277,521,000 n.a.	$322,356,000 n.a.	$1,321,748,000 307,186 Units

n.a.—Not available

U. S. Bureau of the Census

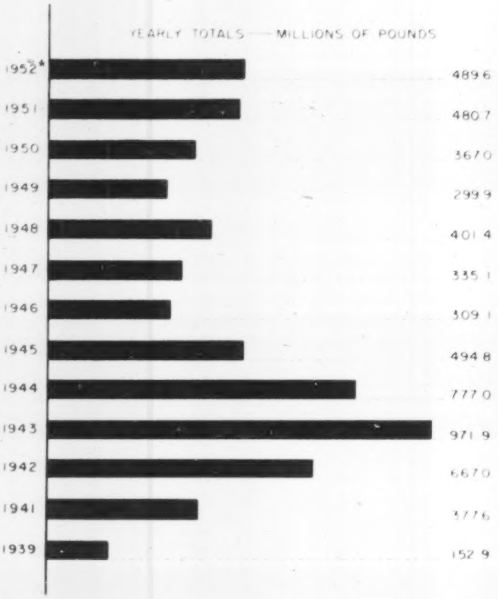
WELDING ELECTRODES

Shipments in Pounds

	Mild Steel	Alloy	Nonferrous	Total
1952				
10 Mos.	338,453,422	65,604,730	1,157,692	405,215,844
Jan.	34,627,235	6,999,979	140,678	41,767,892
Feb.	34,930,851	6,769,708	90,806	41,791,365
Mar.	41,837,669	6,476,757	77,230	48,391,656
Apr.	40,277,856	6,962,554	75,809	47,316,219
May	37,093,046	7,668,145	144,667	44,905,858
June	32,152,266	7,600,762	149,297	39,902,325
July	11,596,090	3,636,134	155,851	15,388,075
Aug.	21,223,963	4,766,026	159,187	26,149,176
Sept.	38,142,142	5,828,412	67,027	44,037,581
Oct.	46,572,304	8,896,253	97,140	55,565,697
Nov.	....	....	....	....
Dec.	....	....	....	....
1952*	....	....	....	489,600,000
1951	413,444,913	65,903,970	1,361,836	480,710,719
1950	322,954,832	42,574,710	1,861,686	367,391,228
1949	273,463,740	24,753,807	1,715,362	299,932,909
1948	369,019,831	30,214,928	2,124,496	401,359,255
1947	307,756,495	25,172,382	2,149,768	335,078,645
1946	284,126,356	24,991,208†	....	309,117,564
1945	435,789,217	59,029,938†	....	494,819,155
1944	707,756,964	69,236,137†	....	776,993,101
1943	....	....	....	971,929,782
1942	....	....	....	666,965,595
1941	....	....	....	377,564,483
1939	....	....	....	152,863,373

† Includes both alloy and nonferrous electrodes. * Estimated.

National Electrical Manufacturers Association



Blowers and Fans

Shipments—Thousands of Dollars

Qtrs.	1952	1951	1950	1949
1st	31,317	30,256	19,345	16,801
2nd	38,332	32,496	28,329	21,098
3rd	36,240	29,608	25,020	19,340
4th	.....	30,034	25,993	15,251
Total	.....	122,394	98,687	72,490

U. S. Bureau of the Census

Air Washers

Shipments—Thousands of Dollars

Qtrs.	1952	1951	1950	1949
1st	252	509	210	247
2nd	343	510	425	218
3rd	344	271	269	169
4th	.....	305	578	284
Total	.....	1,595	1,482	918

U. S. Bureau of the Census

Unit Heaters

Shipments—Thousands of Dollars

Qtrs.	1952	1951	1950	1949
1st	13,288	15,639	7,596	8,318
2nd	11,031	14,000	8,049	6,133
3rd	12,996	14,497	13,519	9,304
4th	.....	17,754	16,467	13,341
Total	.....	61,890	45,631	37,096

U. S. Bureau of the Census

Air Conditioning, Commercial Refrigeration Equipment

Factory Shipments—Number of Units and Value in Thousands of Dollars

	CONDENSING UNITS		COMPRESSORS, COMPRESSOR UNITS		ICE-MAKING MACHINES	
	Number	Value	Number	Value	Number	Value
1951	840,176	$75,672	1,051,937	$56,669	12,998	$8,804
1950	885,913	75,833	954,368	46,977	14,914	8,907
1949	610,341	53,534	604,431	29,929	6,902	4,641
1948	841,609	73,443	459,390	33,493	5,947	5,266
1947	1,039,772	98,296	n.a.	34,586	7,822	3,122
1946	755,538	55,379	191,770	15,377	n.a.	n.a.
1945	351,401	36,902	107,340	9,578	2,805	4,014
1940	211,021	18,808	84,889	7,084	1,015	628

	CENTRIFUGAL-REFRIGERATION SYSTEMS		HEAT EXCHANGER EQUIPMENT		SELF-CONTAINED AIR-CONDITIONING UNITS	
	Number	Value	Number	Value	Number	Value
1951	441	$15,300	......	$65,077	282,488	$93,573
1950	382	12,249	......	61,337	257,263	86,913
1949	285	8,189	......	40,925	123,709	50,584
1948	361	10,351	......	48,552	111,620	49,008
1947	313	7,814	......	63,025	74,976	39,509
1946	312	6,593	......	40,451	47,664	19,500
1945	185	2,994	......	22,422	14,973	11,230
1940	112	2,403	......	17,110	n.a.	n.a.

U. S. Bureau of the Census

n.a. = Not available

Industrial Control Apparatus

Sales

Qtrs.	1952	1951	1950	1949	1948	1947
1st	$50,265,710	$38,268,776	$23,841,436	$24,815,926	$28,239,799	$21,415,731
2nd	54,427,788	46,397,618	27,663,410	27,842,778	29,872,234	26,445,225
3rd	49,085,727	44,551,726	29,872,967	22,869,582	27,289,390	27,962,037
4th	....	50,715,549	37,821,630	23,992,277	29,865,582	31,294,122
Total	....	$179,933,669	$119,199,443	$99,520,563	$115,267,005	$107,117,115

National Electrical Manufacturers Association

Machinery & Equipment

METALWORKING FACTS AND FIGURES

Motors and Generators

New Orders—Thousands of Dollars

Polyphase Induc. Motors, 1-200 hp

Qtrs.	1952	1951	1950
1st	42,455	64,221	28,236
2nd	36,446	56,573	25,436
3rd	.....	44,878	46,582
4th	.....	44,189	55,054
Total	.....	209,861	155,308

DC Generators & Motors, 1-200 hp

Qtrs.	1952	1951	1950
1st	8,793	10,666	4,692
2nd	13,614	12,779	6,106
3rd	.....	9,160	7,428
4th	.....	10,713	10,648
Total	.....	43,318	28,874

YEARLY TOTALS

Polyphase Induc. Motors, 1-200 hp		DC Generators & Motors, 1-200 hp	
1951	209,861	1951	43,318
1950	155,308	1950	28,874
1949	76,063	1949	16,900
1948	95,577	1948	22,273
1947	122,043	1947	20,381
1946	142,464	1946	20,942
1945	87,621	1945	37,194
1944	68,555	1944	74,581
1943	84,862	1943	83,494
1942	114,650	1942	94,693

National Electrical Mfrs. Assn.

Screw Machine Products Shipments

Index—1947-1949=100

1952

Jan.	225	May	203	Sept.	174
Feb.	218	June	198	Oct.	...
Mar.	223	July	148	Nov.	...
Apr.	170	Aug.	178	Dec.	...

1951

Jan.	205	May	194	Sept.	177
Feb.	191	June	204	Oct.	206
Mar.	200	July	162	Nov.	192
Apr.	204	Aug.	197	Dec.	180

YEARLY AVERAGES

1952 (9 Mos.)	193	1951	193

National Screw Machine Products Association

Electric Industrial Trucks and Tractors

Shipments

	Domestic	Export	Total
1952			
9 Mos.	5,018	440	5,458
Jan.	607	51	658
Feb.	611	70	681
Mar.	646	56	702
Apr.	598	45	643
May	617	35	652
June	554	94	648
July	369	25	394
Aug.	528	36	564
Sept.	488	28	516
Oct.	...	...	...
Nov.	...	...	...
Dec.	...	...	...
1951	5,779	746	6,525
Jan.	393	47	440
Feb.	398	63	461
Mar.	519	76	595
Apr.	354	43	397
May	420	44	464
June	519	85	604
July	484	54	538
Aug.	529	62	591
Sept.	385	62	447
Oct.	545	42	587
Nov.	652	76	728
Dec.	581	92	673
1950	2,486	322	2,808
Jan.	180	19	199
Feb.	146	37	183
Mar.	196	33	229
Apr.	172	32	204
May	183	20	203
June	238	30	268
July	177	22	199
Aug.	216	21	237
Sept.	234	29	263
Oct.	255	35	290
Nov.	218	24	242
Dec.	271	20	291
1949	2,251	350	2,601
1948	2,904	543	3,447
1947	3,565	566	4,131
1946	2,714	160	2,874
1945	3,627	224	3,851
1944	4,380	395	4,775
1943	4,280	211	4,491
1942	4,365	207	4,572

U. S. Bureau of the Census

Steel Boilers

New Orders

(100 sq ft or more of heating surface)

GRAND TOTAL—ALL TYPES

	Number	Sq ft
1951	15,484	23,489,097
1950	19,795	23,030,614
1949	14,346	13,094,902
1948	16,408	18,419,968
1947	16,110	18,751,755
1946	19,473	22,645,814
1945	13,076	18,372,439
1944	8,670	13,022,626
1943	10,994	25,587,435
1942	15,647	39,570,941
1941	14,454	27,169,993

STATIONARY BOILERS

1951	7,171	17,698,094
1950	7,827	16,468,567
1949	5,190	8,097,503
1948	6,354	12,628,660
1947	8,140	14,786,298
1946	10,452	18,652,274
1945	7,317	13,244,916
1944	5,006	7,260,313
1943	4,834	5,950,027
1942	6,155	15,656,704
1941	5,253	13,314,573

MARINE BOILERS

1951	281	1,526,482
1950	169	399,998
1949	76	281,999
1948	153	964,106
1947	35	109,753
1946	96	121,705
1945	688	2,653,800
1944	1,312	4,535,814
1943	4,080	18,346,455
1942	4,774	20,771,539
1941	2,123	9,970,792

STEEL HEATING BOILERS

1951	8,032	4,264,521
1950	11,799	6,162,049
1949	9,080	4,715,400
1948	9,901	4,827,202
1947	7,935	3,855,704
1946	8,925	3,871,835
1945	5,071	2,473,723
1944	2,352	1,226,499
1943	2,080	1,290,953
1942	4,718	3,142,698
1941	7,078	3,884,628

U. S. Bureau of the Census

Foundry Equipment Shipments

Dollar Volume

	NEW EQUIPMENT			REPAIRS		
	1952	1951	1950	1952	1951	1950
Jan.	2,470,990	1,319,628	735,171	1,050,171	1,051,322	508,831
Feb.	2,400,533	1,324,955	583,793	1,254,814	980,826	523,501
Mar.	2,219,522	1,555,705	906,870	1,079,688	1,193,149	671,463
Apr.	2,408,582	1,820,795	613,156	1,121,741	1,123,228	577,569
May	2,206,193	2,005,515	789,996	1,026,495	1,175,379	668,547
June	2,362,057	2,271,729	943,249	1,025,317	1,000,061	739,158
July	1,808,622	1,748,113	841,733	871,719	990,494	773,522
Aug.	1,604,814	1,906,368	782,165	937,446	1,112,325	751,158
Sept.	1,580,809	2,383,841	839,508	969,752	1,123,380	725,939
Oct.	1,869,108	2,565,715	1,448,630	1,076,380	1,326,639	934,456
Nov.	....	2,325,261	1,251,705	....	1,019,152	850,128
Dec.	....	2,798,525	1,467,592	....	1,026,385	840,426
Total	....	24,026,150	11,203,568	....	13,122,340	8,564,698

Foundry Equip. Mfrs. Assn.

Orders Placed for New Foundry Equipment

Indexes based on 1937-38-39 monthly average as 100%

	1952		1951		1950		1949	1948
	Dollars	Index	Dollars	Index	Dollars	Index	Index	Index
Jan.	1,862,185	404.5	3,075,267	668.0	730,769	159.3	149.9	380.9
Feb.	922,485	200.4	2,940,273	638.6	519,111	113.1	144.4	367.3
Mar.	1,427,245	310.0	2,757,763	599.0	1,033,585	225.2	190.8	326.2
Apr.	1,773,002	385.1	2,256,232	490.1	737,119	160.6	172.0	412.0
May	1,036,915	225.2	1,987,472	431.7	1,353,284	294.9	121.9	388.5
June	1,628,671	353.8	1,810,435	393.2	2,857,514	622.7	164.9	376.8
July	1,583,121	343.9	1,796,755	390.3	1,843,821	401.8	146.6	456.3
Aug.	1,434,404	311.6	1,862,084	404.5	3,182,714	693.6	127.1	324.7
Sept.	1,684,911	365.9	1,595,440	346.5	2,220,140	483.8	166.6	273.5
Oct.	1,538,448	335.8	1,714,494	372.4	2,417,290	526.8	133.5	296.0
Nov.	....	....	1,406,315	305.5	4,076,638	885.5	270.4	284.4
Dec.	....	....	1,061,108	230.5	2,422,609	526.2	201.0	243.7
Total	....		24,263,638		23,394,994			

Foundry Equip. Mfrs. Assn.

Pumps

(Steam, power, centrifugal, rotary)

New Orders—Thousands of Dollars

	1952	1951	1950	1949	1948
Jan.	5,517	6,477	2,587	3,390	3,819
Feb.	6,020	6,180	2,938	3,217	3,635
Mar.	5,925	7,654	3,313	3,593	4,703
Apr.	6,354	7,583	3,376	2,699	4,312
May	6,140	6,371	3,668	2,775	3,724
June	7,957	6,852	4,153	3,019	3,512
July	6,299	8,358	4,080	3,358	4,075
Aug.	5,921	5,911	6,429	3,767	4,520
Sept.	5,258	6,552	5,191	2,914	3,474
Oct.	.....	6,506	4,985	2,539	3,571
Nov.	.....	5,908	5,961	2,525	3,580
Dec.	.....	5,553	6,720	2,560	4,263
Total	.....	80,205	53,401	36,386	47,188

MONTHLY AVERAGES

1951	6,684	1945	2,869
1950	4,450	1944	3,436
1949	3,032	1943	6,214
1948	3,932	1942	6,155
1947	3,332	1941	3,606
1946	2,105	1939	1,352

Hydraulic Institute

Machinery & Equipment

EARTHMOVING and EXCAVATING EQUIPMENT

Manufacturers' Shipments
(Values in Thousands of Dollars)

Wheel-type Heavy Duty Industrial Tractors

	Units	Value
1952	....	......
1st Qtr.	1,148	$17,946
2nd Qtr.	1,286	26,261
3rd Qtr.	830	12,014
4th Qtr.	....	......
1951	3,505	$55,238
1st Qtr.	643	8,629
2nd Qtr.	981	14,774
3rd Qtr.	807	13,768
4th Qtr.	1,074	18,067
1950	2,065	$24,769
1949	1,047	12,499
1948	1,298	13,962

Road Construction and Maintenance Machinery

	Units	Value
1952	....	......
1st Qtr.	....	$45,434
2nd Qtr.	....	46,833
3rd Qtr.	....	33,494
4th Qtr.	....	......
1951	....	$151,790
1st Qtr.	....	37,670
2nd Qtr.	....	43,318
3rd Qtr.	....	30,917
4th Qtr.	....	39,885
1950	....	$117,540
1949	....	96,883
1948	....	117,908
1947	....	97,272

Construction Machinery for Mounting on Tractors

	Units	Value
1952	....	......
1st Qtr.	....	$16,763
2nd Qtr.	....	23,245
3rd Qtr.	....	17,602
4th Qtr.	....	......
1951	....	$64,816
1st Qtr.	....	16,671
2nd Qtr.	....	18,630
3rd Qtr.	....	12,345
4th Qtr.	....	17,170
1950	....	$58,769
1949	....	38,177
1948	....	44,645

U. S. Bureau of the Census

Power Cranes and Shovels

	Units	Value
1952	....	......
1st Qtr.	2,006	$51,980
2nd Qtr.	1,984	52,756
3rd Qtr.	1,652	44,710
4th Qtr.	....	......
1951	7,333	$180,680
1st Qtr.	1,689	40,471
2nd Qtr.	1,861	46,736
3rd Qtr.	1,740	43,521
4th Qtr.	2,043	49,952
1950	5,108	$109,006
1949	4,114	89,204
1948	8,289	158,586
1947	8,035	132,836

Tracklaying Tractors

	Units	Value
1952	....	......
1st Qtr.	14,162	$78,595
2nd Qtr.	14,808	82,648
3rd Qtr.	7,577	44,055
4th Qtr.	....	......
1951	48,314	$263,533
1st Qtr.	12,426	67,102
2nd Qtr.	13,645	74,544
3rd Qtr.	8,995	47,109
4th Qtr.	13,248	74,778
1950	43,590	$223,042
1949	42,749	196,622
1948	39,949	167,341
1947	37,624	134,361

Portable Well and Blast Hole Drills

	Units	Value
1952	....	......
1st Qtr.	165	$1,622
2nd Qtr.	164	1,408
3rd Qtr.	197	1,750
4th Qtr.	....	......
1951	660	$5,818
1st Qtr.	132	1,082
2nd Qtr.	190	1,379
3rd Qtr.	139	1,627
4th Qtr.	199	1,730
1950	627	$4,472
1949	807	6,774
1948	1,641	10,914
1947	2,040	11,426

Trucks, Truck Tractors, Trailers and Wagons

OFF-HIGHWAY TYPE

	Units	Value
1952	....	......
1st Qtr.	766	$10,072
2nd Qtr.	631	9,716
3rd Qtr.	455	6,298
4th Qtr.	....	......
1951	2,611	$36,840
1st Qtr.	516	8,341
2nd Qtr.	694	8,827
3rd Qtr.	609	7,775
4th Qtr.	792	11,897
1950	1,908	$22,856

Gear Sales

Indexes of New Orders Placed
Average Month 1935-1939=100 per cent

	1952	1951	1950	1949
Jan.	670.6	764.6	280.2	320.7
Feb.	539.5	809.1	272.9	282.3
Mar.	517.1	830.7	358.4	299.1
Apr.	478.7	742.5	328.6	339.0
May	425.9	667.1	363.1	250.1
June	452.3	800.9	401.0	227.8
July	453.9	589.1	410.7	193.1
Aug.	413.9	564.2	617.4	262.0
Sept.	485.0	630.1	654.5	224.9
Oct.	533.1	703.4	561.8	242.3
Nov.	....	530.0	554.9	230.7
Dec.	....	716.5	680.4	242.8

Indexes of New Orders Placed
1947-1948-1949=100 per cent

1952

Jan.	....	May	....	Sept.	143.4
Feb.	....	June	....	Oct.	160.8
Mar.	....	July	145.3	Nov.	....
Apr.	....	Aug.	132.3	Dec.	....

American Gear Manufacturers Association

Electric Industrial Furnaces

New Orders

	Units	Kilowatts	Value
1952			
9 Mos.	5,699	139,733	$19,449,808
January	674	19,829	2,855,761
February	699	9,624	1,362,736
March	744	13,788	2,099,639
April	667	15,039	2,297,949
May	693	23,630	3,713,299
June	567	14,255	1,552,022
July	482	16,937	2,530,164
August	610	13,612	1,625,874
September	563	13,019	1,412,364
October	...	......	....
November	...	......	....
December		......	....
1951	9,392	324,453	$43,497,718
January	686	18,512	2,764,252
February	907	23,253	3,211,657
March	780	32,409	4,846,290
April	718	31,712	3,656,642
May	926	32,171	4,766,008
June	731	39,480	3,369,767
July	895	36,909	5,587,318
August	865	28,768	3,891,339
September	679	21,680	3,250,077
October	775	23,058	3,172,481
November	802	22,640	2,881,619
December	598	13,861	2,100,268
1950	5,891	127,178	$13,880,665
1949	1,664	48,525	5,284,021

Industrial Furnace Mfrs. Assn. Inc.

Fuel Fired Industrial Furnaces

(Except for hot rolling steel mills)
New Orders

	Units	Value
1952		
9 Mos.	1,390	$31,646,676
January	135	3,378,679
February	139	2,413,453
March	148	1,818,109
April	178	3,696,456
May	174	3,031,722
June	127	2,954,493
July	193	6,727,960
August	152	5,258,960
September	144	2,461,844
October	....	....
November	....	....
December	....	....
1951	2,444	$59,262,020
January	216	4,015,702
February	219	4,687,247
March	261	7,019,330
April	251	8,497,273
May	184	5,043,515
June	165	6,259,378
July	189	5,302,979
August	244	4,850,393
September	207	1,820,903
October	208	6,373,871
November	169	2,516,325
December	131	2,875,104
1950	1,508	$22,338,382
1949	800	6,391,107

Industrial Furnace Mfrs. Assn. Inc.

Batteries Shipped

Automotive Replacement Only—Thousands

	1952	1951	1950	1949	1948	1947
Jan	1,639	1,979	1,551	1,313	2,530	1,594
Feb	963	1,469	1,240	873	2,382	1,692
Mar	769	1,176	1,259	592	1,775	1,900
Apr	850	1,892	967	527	1,280	1,973
May	1,137	1,480	1,264	724	1,086	1,980
June	1,535	1,443	1,739	1,119	1,267	1,836
July	2,526	1,705	2,177	1,730	1,592	1,515
Aug	2,904	2,239	3,000	2,798	2,663	2,190
Sept	2,867	2,172	3,091	2,945	2,793	2,552
Oct		2,640	3,178	2,719	3,007	3,016
Nov		2,232	2,680	2,253	2,685	2,836
Dec		1,792	2,296	1,790	2,015	2,741

YEARLY TOTALS

1951	22,219	1948	25,075
1950	24,442	1947	25,828
1949	19,383		

U. S. Department of Commerce

Rigid Steel Conduit and Fittings

Shipments—Net Tons

	1952	1951	1950	1949
Jan	25,982	25,055	15,674	22,705
Feb	25,530	23,389	16,100	21,630
Mar	27,328	28,590	17,708	24,590
Apr	22,767	27,464	16,515	21,931
May	23,243	27,891	17,219	17,566
June	13,881	27,749	21,645	13,240
July	7,214	23,890	24,723	12,568
Aug	17,021	25,017	30,543	12,400
Sept	28,645	25,941	29,123	14,992
Oct		26,680	25,875	17,683
Nov		26,409	24,489	12,662
Dec		23,871	27,561	20,946

YEARLY TOTALS

1951	311,946	1948	281,698
1950	267,175	1947	258,134
1949	212,913	1946	198,144

U. S. Department of Commerce

METALWORKING MACHINERY (Except Machine Tools)

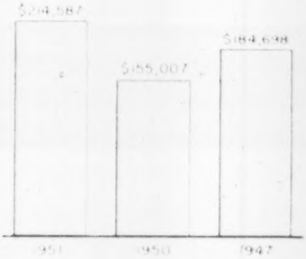
Factory Shipments

	1951		1950		1947	
	Units	Value (thousands)	Units	Value (thousands)	Units	Value (thousands)
Presses (including forging)	19,673	$106,994	14,998	$74,796	n.a.	$109,163
Forging Machines (except presses)	1,367	15,354	1,248	9,953	n.a.	
Punching and Shearing Machines (power)	5,152	26,696	3,981	18,778	4,307	12,552
Punching and Shearing Machines (manual)	5,390	1,349	5,148	1,072	n.a.	n.a.
Bending and Forming Machines (power)	6,372	27,409	6,094	20,209	n.a.	22,239
Bending and Forming Machines (manual)	15,140	3,031	16,677	2,824	n.a.	
Riveting Machines (except hand-held portable type)	3,354	4,279	3,319	3,401	n.a.	3,346
Metal Container Making Machines	1,969	15,304	2,122	12,469	2,546	16,278
Die Casting Machines	294	4,707	313	4,694	397	4,246
Wire Weaving and Wire Fabricating Machines	913	4,487	572	2,849	n.a.	6,681
Drawing Machines and Draw Benches	510	4,977	374	3,962	n.a.	10,193
Total	....	$214,587	....	$155,007	....	$184,698†

† Does not include value of manual punching and shearing machines
U. S. Bureau of the Census

VALUE OF FACTORY SHIPMENTS

(Thousands)



Arc Welding Sets

Units Ordered, Excluding Exports

	Single Operator, Variable Voltage, DC Sets			Transformer Welders	
	Motor Drive	Engine Drive	Generators Only	Industrial Type	Limited Input Type
1952					
Jan.	1,546	1,119	7	1,362	1,496
Feb.	1,517	933	26	1,471	1,923
Mar.	1,569	784	40	1,642	1,899
Apr.	1,329	1,277	21	1,476	1,941
May	1,872	1,025	5	1,596	2,027
June	1,401	975	13	1,438	1,548
July	1,182	847	35	1,233	1,235
Aug.	2,157	811	24	1,434	1,353
Sept.	1,565	761	26	1,535	1,374
Oct.	....	....	...	....	....
Nov.	....	....	...	....	....
Dec.	....	....	...	....	....
1951	13,048	10,333	485	15,645	16,954
Jan.	968	837	170	1,256	1,415
Feb.	1,125	749	12	1,494	1,367
Mar.	1,269	994	47	1,634	1,362
Apr.	1,023	757	16	1,338	1,555
May	1,181	880	16	884	1,637
June	1,397	896	168	1,207	1,509
July	1,239	1,846	13	1,084	1,071
Aug.	579	473	10	1,306	1,063
Sept.	1,168	617	4	1,371	1,098
Oct.	1,096	717	4	1,533	1,875
Nov.	1,059	751	11	1,514	1,825
Dec.	944	816	14	1,024	1,177
1950	10,115	8,207	272	9,652	16,674
1949	7,393	6,193	256	7,295	12,647
1948	10,927	10,435	385	8,792	13,690
1947	13,677	10,822	1,169	9,719	13,034
1946	16,167	10,622	2,818	21,093	16,949
1945	20,716	8,776	2,795	21,448	
1944	30,230	6,023	3,140	15,426	
1943	30,437	4,747	2,068	4,439	
1942	60,261	5,051	2,674	8,236	
1941	35,856	4,412	1,415	4,217	
1940	13,646	2,649	1,168	2,478	
1939	7,242	1,525	995	.....	

National Electrical Manufacturers Association

Contract Stampings Shipments

Index 1947-1949=100

1952

Jan.	139	May	127	Sept.	126
Feb.	136	June	108	Oct.	
Mar.	130	July	90	Nov.	
Apr.	134	Aug.	105	Dec.	

1951

Jan.	165	May	135	Sept.	111
Feb.	172	June	108	Oct.	128
Mar.	173	July	93	Nov.	128
Apr.	161	Aug.	134	Dec.	134

YEARLY AVERAGES

1952* (9 Mos.)	122	1951	137

Pressed Metal Institute

* Estimated

INTERNAL COMBUSTION ENGINES

(Except Automotive and Aircraft)

Factory Shipments

Type	Total Engines Produced	No. Used In Own Product	Shipped To Other Firms Number Engines	Shipped To Other Firms Value (thousands)
1951				
Gasoline and other carburetor (except outboard)	3,080,603	900,015	2,180,588	$185,722
Diesel & semi-diesel	128,846	62,701	66,145	163,854
Outboard	284,383	......	284,383	38,389
Other	138,072	12,408	125,664	71,458
Total	3,631,904	975,124	2,656,780	$459,423
1950				
Gasoline and other carburetor (except outboard)	2,458,274	745,336	1,712,938	$129,816
Diesel & semi-diesel	98,955	56,048	42,907	100,482
Outboard	367,173	......	367,173	41,037
Other	125,850	3,644	122,206	48,777
Total	3,050,252	805,028	2,245,224	$320,112
1947				
Gasoline and other carburetor (except outboard)	2,140,516	545,184	1,595,332	$154,118
Diesel & semi-diesel	100,183	37,125	63,058	156,969
Outboard	584,458	......	584,458	50,038
Other	59,566	2,783	56,783	23,510
Total	2,884,723	585,092	2,299,631	$384,635

U. S. Bureau of the Census

BEARINGS IMPORTS

Ball Bearings and Parts

	lb	Value
1952		
1st Half	422,149	$650,603
1951	843,706	1,541,301
1950	85,027	156,496
1949	12,319	47,979
1948	14,396	55,091
1947	15,973	39,426
1946	48,845	106,953
1945	54,424	84,636
1944	42,922	240,653
1943	10,416	19,659
1942	29,402	54,228

Roller Bearings and Parts

	lb	Value
1952		
1st Half	596,771	$945,978
1951	901,351	1,244,019
1950	88,622	117,673
1949	14,464	38,955
1948	59,538	127,680
1947	40,432	67,144
1946	71,325	127,435
1945	21,455	26,381
1944	11,774	13,731
1943	7,424	8,237
1942	17,500	28,317

Foreign Trade Division, U. S. Bureau of the Census

Transportation

AUTOMOBILE PRODUCTION UNITED STATES AND CANADA

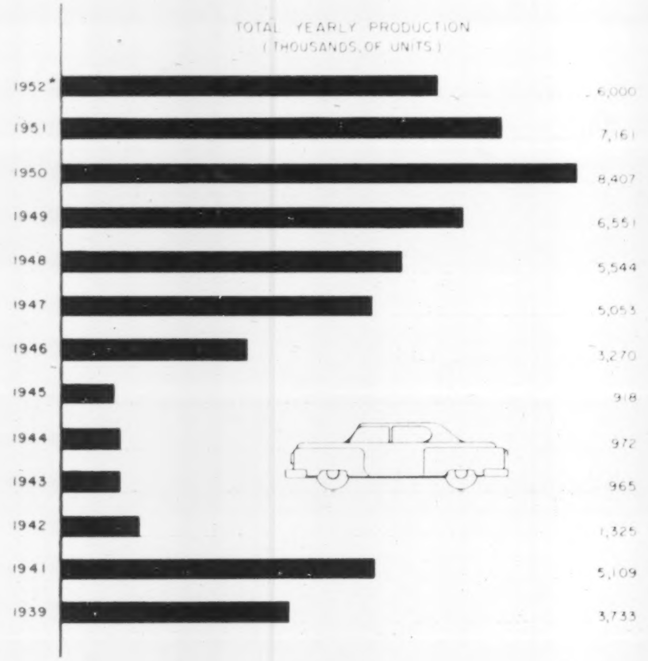
1952	Passenger Cars	Trucks	Total
Jan	303,757	117,277	421,034
Feb	349,107	112,185	461,292
Mar	400,577	121,310	521,887
Apr	444,653	124,851	569,504
May	422,661	119,380	542,041
June	424,584	116,549	541,133
July	185,652	41,958	227,610
Aug	257,729	65,338	323,067
Sept	468,096	124,702	592,798
Oct	509,348	144,993	654,341
Nov	432,387	123,979	556,366
Dec	....	....	....

1951	Passenger Cars	Trucks	Total
Jan	525,061	138,528	661,589
Feb	536,919	122,819	659,738
Mar	641,022	151,528	792,550
Apr	536,516	147,258	683,774
May	537,710	152,385	690,095
June	510,328	143,519	653,847
July	406,959	121,006	527,965
Aug	446,433	130,470	576,903
Sept	380,333	116,435	496,768
Oct	432,643	118,179	550,822
Nov	375,381	103,734	479,115
Dec	296,567	91,694	388,261

YEARLY PRODUCTION

Year	Passenger Cars	Trucks	Total
1952*	4,650,000	1,350,000	6,000,000
1951	5,625,872	1,535,555	7,161,427
1950	6,957,201	1,449,650	8,406,851
1949	5,321,210	1,230,093	6,551,303
1948	4,078,496	1,465,291	5,543,787
1947	3,723,383	1,329,290	5,052,673
1946	2,247,792	1,021,963	3,269,755
1945	85,654	832,017	917,671
1944	....	972,000	972,000
1943	....	965,400	965,400
1942	218,872	1,106,153	1,325,025
1941	3,838,345	1,270,647	5,108,992
1939	2,975,165	757,553	3,732,718

Ward's Automotive Reports * Estimated



Busses
Shipments from U. S. Factories

	1952	1951	1950	1949
January	778	661	219	658
February	625	521	133	418
March	569	829	199	545
April	597	819	268	514
May	423	742	412	564
June	184	838	598	632
July	224	665	397	439
August	349	783	457	444
September	387	743	423	298
October	389	1,174	553	322
November	....	833	584	308
December		845	664	369

YEARLY TOTALS

1951	9,453	1945	9,500
1950	4,907	1944	5,799
1949	5,611	1943	1,613
1948	12,299	1942	8,337
1947	19,110	1941	7,626
1946	10,091	1940	6,147

Automobile Manufacturers Association

New Transit Equipment Delivered

	Surface Cars	Subway & Elevated Cars	Trolley Coaches	Motor Busses	Total
1952†	75	114	330	1,500	2,019
1951	56	140	600	4,552	5,348
1950	4	199	179	2,668	3,050
1949	273	415	680	3,358	4,726
1948	478	248	1,430	7,009	9,165
1947	626	2	955	12,029	13,612
1946	421	0	266	6,463	7,150
1945	332	0	161	4,441	4,934
1944	284	0	60	3,807	4,151
1943	32	0	116	1,251	1,399
1942	284	0	356	7,200	7,840
1941	462	0	227	5,600	6,289

† Preliminary
American Transit Association

TRUCK TRAILERS

	PRODUCTION, By Types of Trailers										Shipments	
	Vans	Tanks	Pole, Pipe & Logging	Platforms	Low-Bed Heavy Haulers	Dump Trailers	All Other	Converter Dollies	Trailer Chassis Only	Total Production Units	Units	Value
1952												
9 Mos	16,311	3,906	1,843	10,102	4,502	840	1,447	735	2,627	42,313	42,605	$167,807,000
Jan	1,950	534	135	1,014	562	70	392	43	313	5,013	4,941	19,412,000
Feb	1,873	480	149	1,072	589	58	195	20	219	4,655	4,633	18,638,000
Mar	1,994	480	204	1,323	495	94	143	27	364	5,124	5,259	20,676,000
Apr	1,963	477	296	1,284	603	106	104	96	369	5,298	5,308	20,126,000
May	1,854	443	218	1,375	496	101	115	226	335	5,163	5,166	19,758,000
June	1,219	403	261	1,120	468	97	113	56	292	4,029	4,027	16,445,000
July	1,281	303	223	876	404	167	115	41	263	3,673	3,934	16,656,000
Aug	1,897	403	166	1,031	409	72	130	133	230	4,471	4,421	16,293,000
Sept	2,286	383	191	1,007	476	75	140	93	242	4,887	4,916	19,803,000
Oct	...	...	...	....	...	...	...	...	...	....	....	....
Nov	...	...	...	....	...	...	...	...	...	....	....	....
Dec	...	...	...	....	...	...	...	...	...	....	....	....
1951	32,571	5,961	3,004	13,417	4,188	1,321	3,657	...	3,265	67,384	64,691	$245,315,000
Jan	3,952	410	232	1,101	159	110	301	...	218	6,483	6,376	23,160,000
Feb	3,669	422	209	898	159	103	381	...	203	6,044	5,852	20,980,000
Mar	3,950	530	352	1,008	230	103	636	...	293	7,102	7,058	24,550,000
Apr	3,459	449	340	1,146	212	122	271	...	352	6,351	5,798	20,850,000
May	3,613	550	354	1,174	432	109	297	...	332	6,861	5,936	22,451,000
June	2,685	512	307	1,216	224	131	255	...	261	5,591	4,972	19,701,000
July	1,984	405	240	1,101	441	109	136	...	232	4,648	4,758	18,779,000
Aug	1,697	454	257	1,325	384	123	235	...	288	4,763	5,200	20,167,000
Sept	1,599	516	193	1,282	455	114	185	...	254	4,598	4,643	18,312,000
Oct	2,251	607	199	1,318	531	128	270	...	301	5,605	5,605	21,594,000
Nov	1,853	504	168	996	470	101	349	...	263	4,704	4,278	17,351,000
Dec	1,859	602	153	852	491	68	341	...	268	4,634	4,215	17,420,000

YEARLY TOTALS

	Production, Units	Shipments Units	Shipments Value		Production, Units	Shipments Units	Shipments Value
1951	67,384	64,691	$245,315,000	1948	44,478	46,960	$139,996,000
1950	64,617	65,966	229,685,000	1947	53,096	55,372	138,383,093
1949	33,097	34,273	119,098,000	1946	76,234	73,001	151,384,063

U. S. Bureau of the Census

Merchant Ship Construction

Steel self-propelled vessels of 2000 gross tons and over built in private U. S. yards†.

Year	No.	Gross Tonnage	Year	No.	Gross Tonnage
1951..	10	147,569	1940..	53	444,727
1950..	26	415,499	1939..	28	241,052
1949..	34	538,873	1938..	26	185,658
1948..	29	164,482	1937..	15	121,852
1947..	50	286,473	1936..	8	63,428
1946..	88	672,554	1935..	2	19,022
1945..	1,067	7,663,362	1934..	2	9,544
1944..	1,463	11,404,404	1933..	4	49,527
1943..	1,661	12,499,873	1932..	15	145,470
1942..	724	5,392,953	1931..	14	150,949
1941..	95	749,105	1930..	16	151,208

TYPES OF VESSELS CONSTRUCTED—1951

	Number	Gross Tonnage
Passenger	2	47,438
Tanker	4	71,138
Ore Carrier	1	3,425
Cargo	3	25,568
Total	10	147,569

† On Jan. 1, 1952, 96 vessels aggregating 1,251,190 gross tons were under construction, compared with 29 vessels aggregating 400,833 gross tons on Jan. 1, 1951.

Shipbuilders Council of America

Uncompleted Merchant Vessels

Jan. 1, 1952

Type	Number	Gross Tonnage
Auto Ferry	1	7,420
C-4 Cargo	35	339,500
Passenger	1	51,500
Bulk Ore Carrier	14	170,000
River Ore Carrier	1	3,800
Tanker	37	603,020
Navy Transport	3	40,500
Passenger-Railway Ferry	2	8,600
Self-Unloader Carrier	2	26,850
Total	96	1,251,190

Shipbuilders Council of America

Naval Shipbuilding

Private Yards' Naval Backlog

Jan. 1, 1952

Type	Number	Displacement Tonnage
Destroyer	5	17,020
Task Fleet Command Ship	1	17,000
Submarine	5	7,710
Destroyer Leader	1	5,530
Aircraft Carrier	1	59,900
Escort Vessel	1	1,450
Net Layer	1	680
Oiler	1	11,600
Landing Ship	16	93,290
Total	32	214,180

Contracted for in 1951

Type	Number	Displacement Tonnage
Aircraft Carrier	1	59,900
Escort Vessel	1	1,450
Submarine	2	3,000
Net Layer	1	680
Oiler	1	11,600
Landing Ship	16	93,290
Total	22	169,920

Delivered in 1951

Type	Number	Displacement Tonnage
Anti-Submarine Submarine	1	765

Shipbuilders Council of America

Civil Aircraft

Complete Airplanes Shipped

	—Number—		—Value— (Thousands)	
	1952	1951	1952	1951
January	221	255	$11,994	$ 4,859
February	227	239	15,794	3,667
March	248	272	17,109	3,346
April	291	247	15,811	13,352
May	330	248	20,439	10,738
June	335	216	14,640	8,090
July	353	207	15,611	6,419
August	349	171	13,705	5,485
September	337	184	19,823	5,525
October		124		3,831
November		162		10,477
December		152		13,055

YEARLY TOTALS

	Number	Value
1951	2,477	$ 88,844,000
1950	3,520	100,097,000
1949	3,545	121,446,334
1948	7,302	114,207,590
1947	15,870	179,093,000

U. S. Bureau of the Census

New Locomotives Placed in Service by Class 1 Railroads

1952	—Diesel-Electric— Locomotives	—Diesel-Electric— Power Units	—Electric— Locomotives	—Electric— Power Units	Steam	Total
10 Mos.	2,080	2,650	1	2	15	2,096
Jan.	260	336	0	0	1	261
Feb.	224	298	1	2	1	226
Mar.	203	281	0	0	1	204
Apr.	191	252	0	0	1	192
May	264	317	0	0	2	266
June	222	276	0	0	2	224
July	119	146	0	0	1	120
Aug.	208	269	0	0	2	210
Sept.	188	227	0	0	2	190
Oct.	201	218	0	0	2	203
Nov.	...	...	..	..	..	...
Dec.	...	...	..	..	..	...

	Diesel	Steam	Electric	Total
1951	2,537	18	3	2,558
Jan.	218	1	0	219
Feb.	189	0	0	189
Mar.	210	1	0	211
Apr.	217	2	0	219
May	214	2	1	217
June	251	2	1	254
July	172	2	0	174
Aug.	162	2	0	164
Sept.	207	2	0	209
Oct.	277	2	0	279
Nov.	229	1	1	231
Dec.	191	1	0	192
1950	2,372	12	12	2,396
1949	1,808	57	0	1,865
1948	1,397	86	4	1,487
1947	771	72	2	845

Association of American Railroads

Bicycles Shipped

1952*	1,800,000	1947	2,750,000
1951	1,800,000	1946	1,650,000
1950	1,950,000	1942-1945	None
1949	1,600,000	1941	1,830,000
1948	2,750,000	1939	1,220,000

* Estimated

Railroad Passenger Car Shipments

Number of Cars

	1952	1951	1950	1949	1948
Jan.	8	26	61	91	83
Feb.	21	19	64	80	74
Mar.	4	26	87	76	94
Apr.	12	29	82	85	121
May	2	23	113	95	64
June	13	38	106	98	46
July	8	19	94	69	62
Aug.	5	14	104	70	61
Sept.	13	25	70	94	65
Oct.	..	22	71	90	92
Nov.	..	45	58	85	88
Dec.	..	25	54	80	96

MONTHLY AVERAGES

1951	26	1945	78	1939	25
1950	80	1944	84	1938	36
1949	84	1943	59	1937	52
1948	79	1942	36	1936	16
1947	74	1941	30	1935	17
1946	114	1940	21		

American Railway Car Institute

Freight Cars Ordered

Domestic

	1952	1951	1950	1949	1948
Jan.	5,348	26,233	9,380	1,638	8,619
Feb.	6,047	14,093	9,065	332	10,695
Mar.	5,833	10,611	6,201	199	13,227
Apr.	639	6,229	3,298	30	17,205
May	2,502	4,264	11,635	589	2,141
June	2,385	6,040	2,095	153	5,368
July	1,536	2,401	30,065	408	10,508
Aug.	4,558	1,781	23,832	185	3,244
Sept.	3,628	8,992	25,086	123	738
Oct.	1,423	3,175	21,306	201	8,330
Nov.	2,878	6,746	10,423	1,145	4,352
Dec.	....	3,309	3,306	1,220	8,348
Total		93,874	155,692	6,223	92,775

YEARLY TOTALS

1947	120,163	1946	67,193

American Railway Car Institute

FREIGHT CAR SHIPMENTS

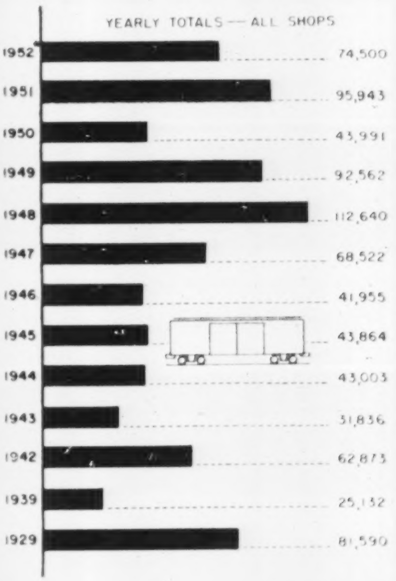
Domestic—Number of Cars

1952	Car-Builders	Railroad Shops	Total No. Cars
Jan.	6,081	2,561	8,642
Feb.	5,494	1,889	7,383
Mar.	5,838	2,321	8,159
Apr.	5,204	2,199	7,403
May	4,765	2,092	6,857
June	4,848	1,563	6,411
July	3,860	1,542	5,402
Aug.	2,853	1,684	4,537
Sept.	1,879	1,883	3,762
Oct.	2,963	2,474	5,437
Nov.	4,032	1,897	5,929
Dec.	....	....	....
11 Mos.	47,817	22,105	69,922

1951	Car-Builders	Railroad Shops	Total No. Cars
Jan.	4,405	1,548	5,953
Feb.	4,514	1,328	5,842
Mar.	4,966	2,045	7,011
Apr.	5,781	2,493	8,274
May	7,198	2,576	9,774
June	7,185	2,459	9,644
July	4,014	1,276	5,290
Aug.	5,156	2,027	7,183
Sept.	5,755	2,823	8,578
Oct.	6,777	3,335	10,112
Nov.	6,315	3,509	9,824
Dec.	5,678	2,780	8,458
Total	67,744	28,199	95,943

American Railway Car Institute

* Estimated



Appliances

Floor and Wall Furnaces

Factory Shipments

	1952		1951	
	Number of Units	Value, Thousands of Dollars	Number of Units	Value, Thousands of Dollars
Jan	28,827	1,609	48,761	2,988
Feb	29,681	1,763	51,092	2,984
Mar	26,646	1,603	51,603	3,234
Apr	27,578	1,617	35,331	2,052
May	32,956	1,950	33,155	2,100
June	34,654	2,112	24,861	1,503
July	47,033	2,962	27,699	1,655
Aug	56,641	3,662	36,767	2,403
Sept	68,478	4,446	51,724	3,172
Oct			69,630	4,251
Nov			45,870	2,717
Dec			28,057	1,542

YEARLY TOTALS

	Number of Units	Value, Thousands of Dollars
1951	507,283	30,601
1950	686,395	39,753
1949	448,924	25,132

U. S. Bureau of the Census

Oil Burners

Shipments—Burners and Units

	1952		1951	
	Residential	Com'l, Indus'l	Residential	Com'l, Indus'l
Jan	43,359	2,389	60,863	3,611
Feb	35,424	2,368	55,810	3,271
Mar	37,875	2,163	52,348	3,621
Apr	43,586	2,219	44,060	3,316
May	49,211	2,532	39,305	3,248
June	54,961	2,866	44,394	3,486
July	63,500	3,544	41,886	3,278
Aug	81,567	3,053	60,784	3,786
Sept.	100,663	3,435	72,847	3,521
Oct	.....	.....	89,600	3,754
Nov	.....	.....	61,666	2,975
Dec	.....	.....	37,688	2,704
Total		.....	661,251	40,565

YEARLY TOTALS

	Residential	Com'l, Indus'l		Residential	Com'l, Indus'l
1950	879,922	33,447	1942	82,357†	48,674
1949	569,445	24,465	1941	271,673†	32,196
1948	392,625	27,043	1940	247,663†	16,569
1947	1,078,576	48,776	1939	201,735†	13,295
1946	499,009	37,306	1938	129,323†	9,888
1945	139,611	30,750	1937	177,675†	15,505
1944	45,752†	31,329	1936	182,130†	14,747
1943	27,956†	44,602	1935	126,820†	12,079

† Includes water heating units

U. S. Bureau of the Census

Mechanical Stokers

Factory Sales—Number of Units

	1952		1951	
	Small†	Large†	Small†	Large†
Jan	1,156	332	1,466	371
Feb	1,028	232	1,314	366
Mar	872	225	1,445	334
Apr	946	219	1,058	295
May	1,019	281	822	336
June	1,541	352	1,119	442
July	1,423	493	1,176	406
Aug	2,295	498	2,477	586
Sept	2,658	503	2,651	589
Oct			2,861	617
Nov			1,745	405
Dec			910	270

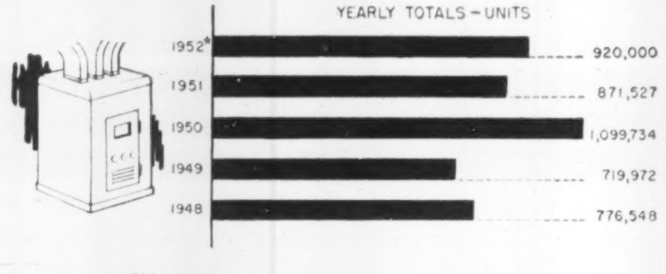
YEARLY TOTALS

	Small†	Large†		Small†	Large†
1951	19,074	5,017	1945	119,079	11,745
1950	19,635	5,102	1944	51,603	11,355
1949	29,311	5,949	1943	17,765	15,074
1948	77,220	8,938	1942	79,062	8,938
1947	61,596	7,312	1941	182,556	9,491
1946	181,225	9,695	1939	96,245	8,044

† Small consists of classes 1 and 2 as defined by U. S. Bureau of the Census and large consists of classes 3, 4 and 5.

WARM AIR FURNACES

(Cast Iron and Steel)



Shipments

	1952		1951	
	Number of Units	Value, Thousands of Dollars	Number of Units	Value, Thousands of Dollars
Jan.	49,959	10,444	71,730	14,549
Feb.	48,529	9,709	72,357	14,807
Mar.	51,277	10,490	79,633	16,056
Apr.	50,933	10,125	60,715	12,000
May	58,732	11,589	56,676	11,544
June	70,206	14,079	62,435	12,929
July	77,356	15,550	55,569	11,742
Aug.	105,410	21,393	78,176	16,359
Sept.	116,300	23,823	88,297	18,841
Oct.	.....	.....	106,128	22,252
Nov.	.....	.....	84,093	17,657
Dec.	.....	.....	55,718	12,112

Yearly Totals	Number of Units	Value, in dollars
1951	871,527	180,848,000
1950	1,099,734	205,484,000
1949	719,972	130,548,000
1948	776,548	136,936,932
1947	850,783	141,943,102
1946	699,058	88,016,228
1945	372,974	37,938,586

U. S. Bureau of the Census

* Estimated

Forced Air Furnaces

Shipments—Number of Units

	Solid Fuel	Oil	Gas	Total
1952				
9 Mos.	13,762	233,371	269,771	516,904
Jan.	1,111	19,574	20,836	41,521
Feb.	920	18,171	19,894	38,985
Mar.	1,190	19,919	21,726	42,835
Apr.	920	18,628	23,137	42,685
May	1,240	19,642	27,985	48,867
June	1,223	26,059	31,003	58,285
July	1,813	29,502	33,409	64,724
Aug.	2,713	38,473	44,824	86,010
Sept	2,632	43,403	46,957	92,992
Oct	.....	.....	.....	.....
Nov.	.....	.....	.....	.....
Dec.	.....	.....	.....	.....
1951	27,505	313,453	324,339	665,297
Jan.	1,580	26,050	29,158	56,788
Feb	1,942	24,340	29,633	55,915
Mar.	2,585	23,800	32,818	59,203
Apr.	2,413	18,801	24,395	45,609
May	2,062	18,305	22,486	42,853
June	2,158	20,772	23,175	46,105
July	1,821	21,052	20,061	42,934
Aug.	3,043	28,797	25,240	57,080
Sept	2,887	35,454	27,801	66,142
Oct	3,440	41,789	35,218	80,447
Nov	2,299	32,806	31,419	66,524
Dec	1,275	21,487	22,935	45,697
1950	30,145	344,181	465,327	839,653
1949	32,827	204,256	212,123	449,206
1948	77,958	179,479	143,536	400,973
1947	31,404	290,114	142,319	463,837

U. S. Bureau of the Census

Gravity Air-Flow Furnaces

Shipments—Number of Units

	Solid Fuel	Oil	Gas	Total
1952				
9 Mos.	55,292	12,820	44,639	112,751
Jan.	4,087	924	3,470	8,481
Feb	4,283	1,138	4,123	9,544
Mar	3,442	929	4,071	8,442
Apr	3,289	1,067	3,892	8,248
May	4,670	941	4,254	9,865
June	5,121	1,176	5,624	11,921
July	6,765	1,448	5,329	13,542
Aug	10,754	2,181	6,465	19,400
Sept.	12,881	3,016	7,411	23,308
Oct.	.....	.....	.....	.....
Nov		.....	.....	.....
Dec.	.....	.....	.....	.....
1951	119,368	18,330	68,532	206,230
Jan	6,529	945	7,468	14,942
Feb	9,101	781	6,560	16,442
Mar	10,893	948	8,589	20,430
Apr	8,274	967	5,865	15,106
May	8,099	1,087	4,637	13,823
June	9,409	1,638	5,283	16,330
July	7,944	1,026	3,665	12,635
Aug	13,742	2,431	4,923	21,096
Sept	13,909	2,308	5,938	22,155
Oct	17,146	2,748	5,787	25,681
Nov	9,649	2,160	5,760	17,569
Dec	4,673	1,291	4,057	10,021
1950	107,585	18,003	134,493	260,081
1949	168,981	15,048	86,737	270,766
1948	319,958	10,997	44,620	375,575
1947	315,994	25,426	45,526	386,946

U. S. Bureau of the Census

Cast Iron Boilers, Radiators and Convectors

Shipments

Boilers

	Thousands of Pounds		Value, Thousands of Dollars	
	1952	1951	1952	1951
Jan.	11,318	21,262	2,603	4,706
Feb.	10,211	19,458	2,430	4,382
Mar.	9,161	19,456	2,329	4,361
Apr.	9,480	12,898	2,409	2,933
May	13,346	10,443	3,194	2,418
June	16,962	12,770	3,968	2,986
July	17,285	11,461	3,989	2,708
Aug.	24,037	18,748	5,538	4,229
Sept.	29,455	22,129	6,641	5,111
Oct.		31,080		6,780
Nov.		19,335		4,342
Dec.		11,168		2,638

YEARLY TOTALS

	Thousands of Pounds	Value, Thousands of Dollars
1951	210,208	47,594
1950	267,911	54,676
1949	206,296	40,525
1948	263,303	43,756
1947	326,129	48,273

Radiation †

	Thousands of sq ft		Value, Thousands of Dollars	
	1952	1951	1952	1951
Jan.	2,784	4,675	1,783	2,805
Feb.	2,226	4,311	1,484	2,609
Mar.	2,074	4,657	1,360	2,866
Apr.	1,760	3,550	1,155	2,218
May	2,145	2,413	1,409	1,537
June	2,925	2,285	1,904	1,473
July	2,915	2,221	1,910	1,305
Aug.	3,974	3,564	2,592	2,189
Sept.	4,729	4,056	3,121	2,512
Oct.		4,798		3,032
Nov.		3,512		2,259
Dec.		2,470		1,591

YEARLY TOTALS

	Thousands of sq ft	Value, Thousands of Dollars
1951	42,512	26,396
1950	48,175	26,436
1949	35,888	19,936
1948	60,333	31,426
1947	56,720	24,356

† Includes radiators and convectors
U. S. Bureau of the Census

Domestic Heating Stoves

Shipments—1952

	Coal, Wood	Gas	Oil	Total
Jan.	22,761	63,696	58,811	145,268
Feb.	19,318	60,843	64,301	144,462
Mar.	25,450	64,120	64,864	154,434
Apr.	25,381	62,014	60,040	147,435
May	35,676	76,324	60,303	172,303
June	40,963	120,878	68,900	230,741
July	79,027	197,680	117,127	393,834
Aug.	132,211	236,849	146,296	515,356
Sept.	158,518	243,323	165,525	567,366
Oct.				

YEARLY TOTALS

	Coal, Wood	Gas	Oil	Total
1951	1,047,627	1,896,619	1,238,840	4,183,086
1950	888,515	2,023,278	1,320,616	4,232,409
1949	955,571	1,441,335	1,265,865	3,662,771
1948	1,203,606	2,983,990	1,039,693	5,227,289

U. S. Bureau of the Census

Coal and Wood Cooking Stoves

Shipments—Units

	1952	1951	1950	1949
Jan.	9,501	12,061	10,453	14,307
Feb.	9,589	10,864	11,987	15,890
Mar.	8,625	12,639	14,426	17,130
Apr.	7,475	8,152	12,055	12,555
May	6,267	7,837	8,697	10,693
June	5,702	9,126	8,847	10,376
July	7,080	6,238	11,177	11,707
Aug.	8,820	9,953	21,108	17,186
Sept.	9,211	11,666	16,220	19,060
Oct.		11,255	14,890	16,720
Nov.		11,474	11,251	15,000
Dec.		9,435	10,051	9,304

YEARLY TOTALS

1951	126,700	1949	169,928	1947	449,356
1950	151,162	1948	295,527	1946	405,107

U. S. Bureau of the Census

Gas Water Heaters

Shipments—Underfired and Sidearm Types

	1952		1951	
	Units	Value, Thousands of Dollars	Units	Value, Thousands of Dollars
Jan.	155,138	7,476	212,554	11,424
Feb.	153,634	7,365	228,260	11,179
Mar.	160,019	7,899	238,038	12,188
Apr.	159,681	7,684	213,638	10,665
May	163,648	7,732	179,973	9,289
June	165,718	7,963	142,724	7,373
July	138,441	6,329	110,871	5,829
Aug.	168,022	7,977	134,112	6,601
Sept.	179,592	8,697	138,416	6,339
Oct.			159,756	7,524
Nov.			152,216	7,181
Dec.			133,852	6,186

YEARLY TOTALS

	Units	Value
1951	2,074,410	$101,778,000
1950	2,562,973	111,624,000
1949	1,656,385	74,106,000
1948	1,730,331	77,034,830

U. S. Bureau of the Census

Plumbing Fixtures

Shipments—Value in Thousands of Dollars

VITREOUS CHINA AND GLAZED EARTHENWARE

Qtr.	1952	1951	1950	1949
1st	$19,310	$31,061	$21,202	$20,319
2nd	21,179	30,382	23,723	17,547
3rd	23,115	26,066	28,217	18,471
4th		20,734	29,190	20,822
Total		$108,243	$102,332	$77,159

METAL—EXCLUSIVE OF FITTINGS

Qtr.	1952	1951	1950	1949
1st	$39,174	$64,457	$42,902	$27,919
2nd	43,820	57,084	49,380	28,787
3rd	48,946	41,754	57,587	39,255
4th		39,235	62,806	43,266
Total		$202,530	$212,675	$139,227

YEARLY TOTALS

VITREOUS CHINA AND GLAZED EARTHENWARE

1948	$84,001	1947	$62,641

METAL—EXCLUSIVE OF FITTINGS

1948	$171,163	1947	$126,912

U. S. Bureau of the Census

Oil Cooking Stoves

(Kerosene, Gasoline and Fuel Oil)

Shipments—Units

	1952	1951	1950	1949
Jan.	8,105	16,445	14,365	14,733
Feb.	11,229	15,311	15,739	19,774
Mar.	10,281	14,752	18,663	20,064
Apr.	9,188	9,248	11,862	14,615
May	9,783	8,720	13,904	14,113
June	10,433	9,419	16,564	13,702
July	8,159	8,430	14,682	11,000
Aug.	9,438	8,425	22,153	17,312
Sept.	11,485	9,720	18,670	14,023
Oct.		13,090	13,952	16,806
Nov.		11,376	13,544	15,824
Dec.		7,867	16,738	13,973

YEARLY TOTALS

1951	132,823	1949	185,929	1947	559,579
1950	190,776	1948	466,777	1946	516,308

U. S. Bureau of the Census

Electric Lamps (Bulbs)

Manufacturers' Shipments
Value in Thousands of Dollars

	Domestic	Export	Total
1951	$252,465	$11,670	$264,135
1950	233,860	9,297	243,157
1949	192,638	7,240	199,878
1948	199,291	8,879	208,170
1947	183,789	10,600	194,389
1946	136,281	7,584	143,865
1945	136,725	7,423	144,148
1944	n.a.	n.a.	137,166

PRODUCTION

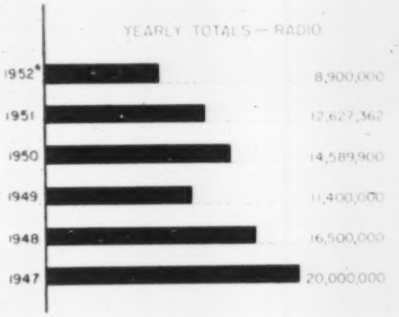
Thousands of Lamps

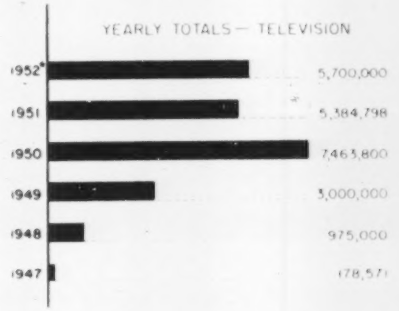
1951	2,341,154	1949	1,832,423
1950	2,084,607	1948	1,976,674

n.a.—Not available
U. S. Bureau of the Census

RADIO AND TELEVISION RECEIVERS

Number Produced





RADIOS

1952	Home	Portable	Auto	Clock
10 Mos.	2,910,718	1,111,662	2,127,612	1,311,889
Jan.	288,723	68,433	195,147	80,152
Feb.	312,705	72,866	267,779	106,103
Mar.	357,689	99,720	343,314	175,169
Apr.	286,164	110,529	275,250	176,003
May	288,927	128,351	215,478	115,588
June	297,669	205,186	246,909	124,489
July	203,868	81,353	95,220	61,295
Aug.	235,728	105,006	94,315	108,753
Sept.	324,786	126,666	230,706	183,496
Oct.	314,459	113,552	163,494	180,841
Nov.				
Dec.				

TOTAL RADIOS PRODUCED

1952—10 Mos. 7,461,881

Jan.	632,455	July	441,736
Feb.	759,453	Aug.	543,802
Mar.	975,892	Sept.	865,654
Apr.	847,946	Oct.	772,346
May	748,344	Nov.	
June	874,253	Dec.	

YEARLY TOTALS

	Units	Value (Manufacturers')
1951	12,627,362	$315,936,597
1950	14,589,900	375,000,000
1949	11,400,000	310,000,000
1948	16,500,000	525,000,000
1947	20,000,000	650,000,000

TELEVISION

1952—10 Mos. 4,394,798

Jan.	404,933	July	198,921
Feb.	409,337	Aug.	397,769
Mar.	510,561	Sept.	755,665
Apr.	322,878	Oct.	724,117
May	309,375	Nov.	
June	361,152	Dec.	

YEARLY TOTALS

	Units	Value (Manufacturers')
1951	5,384,798	$956,986,300
1950	7,463,800	1,350,000,000
1949	3,000,000	580,000,000
1948	975,000	230,000,000
1947	178,571	50,000,000

*Estimated
Radio-Television Manufacturers Association

Appliances

Electric Disc Stoves and Hot Plates

(1650 Watts or Less)

(Sales Billed—Units)

	1952	1951	1950	1949
Jan	21,178	35,776	27,069	12,730
Feb	25,435	40,188	30,707	20,272
Mar	25,617	60,294	45,609	26,934
Apr	21,829	56,734	35,712	19,046
May	17,368	25,304	31,283	23,057
June	20,503	18,080	38,665	25,627
July	17,323	12,862	23,379	22,677
Aug	33,945	21,366	69,695	35,610
Sept	35,811	19,754	57,768	37,332
Oct		20,229	15,660	49,783
Nov		21,124	36,796	37,663
Dec		15,047	50,273	23,696
Total		352,758	483,556	334,427

National Electrical Manufacturers Association

Electric Air Heaters, Portable

Sales Billed—Units

CONVECTOR AND RADIANT

	1952	1951	1950	1949
Jan	3,885	11,271	5,910	11,935
Feb	2,433	15,825	3,642	7,377
Mar	2,167	17,292	6,741	2,924
Apr	1,951	7,872	860	2,066
May	2,232	9,361	1,523	2,305
June	2,524	8,018	7,551	7,871
July	7,955	5,469	13,400	30,862
Aug	27,561	7,143	40,300	11,923
Sept	13,943	17,233	42,083	129,706
Oct		31,365	65,104	106,609
Nov		16,478	26,858	69,333
Dec		20,782	15,612	18,443
Total		161,115	229,620	437,054

FAN FORCED AND FAN AND HEATER COMBINATION

	1952	1951	1950
Jan	18,247	36,626	6,556
Feb	8,504	37,628	4,628
Mar	8,674	20,856	8,069
Apr	2,366	8,526	4,002
May	9,761	3,054	3,093
June	11,352	3,046	17,066
July	31,399	11,654	32,423
Aug	50,905	35,015	73,692
Sept	57,147	44,070	73,324
Oct		59,117	55,730
Nov		54,684	42,243
Dec		32,064	42,395
Total		349,337	363,254

National Electrical Manufacturers Association

Standard-Size Ironers

Factory Sales—Units

	1952	1951	1950	1949
Jan	15,636	21,600	20,300	28,300
Feb	17,630	32,400	27,600	28,400
Mar	13,913	34,700	37,800	23,800
Apr	8,938	23,700	31,600	18,100
May	12,652	24,200	27,400	19,500
June	17,654	24,500	27,100	21,100
July	15,025	11,500	25,100	17,700
Aug	16,477	17,200	42,700	32,300
Sept	22,492	18,300	44,400	27,700
Oct	25,204	29,800	47,500	36,045
Nov		20,500	41,900	35,000
Dec		16,900	38,800	19,400

YEARLY TOTALS

1951	277,900	1946	124,616
1950	409,200	1945 (1)	None
1949	307,345	1942	66,090
1948	476,276	1941	259,668
1947	599,258	1939	127,093

(1) Civilian production stopped from mid-1942 through 1945.

American Home Laundry Manufacturers' Association

Electric Grills and Waffle Irons

Sales Billed—Units

Sandwich Grills & Griddles & Combination Grills & Waffle Irons

	1952	1951	1950
Jan	25,004	93,409	53,725
Feb	23,821	110,702	70,402
Mar	28,784	132,221	85,181
Apr	21,879	98,463	70,406
May	31,974	48,964	75,736
June	44,382	37,505	82,551
July	33,606	42,186	78,082
Aug	105,854	48,767	182,917
Sept	106,947	100,009	186,528
Oct		107,384	112,250
Nov		58,103	128,579
Dec		45,682	153,976
Total		923,395	1,310,333

WAFFLE IRONS

	1952	1951	1950
Jan	6,523	25,589	18,257
Feb	8,037	28,136	21,653
Mar	5,570	28,782	15,187
Apr	4,350	31,805	12,944
May	3,210	21,287	20,113
June	3,100	10,697	23,697
July	7,493	7,198	12,212
Aug	13,915	18,915	65,322
Sept	15,484	17,703	82,661
Oct		23,275	61,946
Nov		17,219	59,389
Dec		10,398	42,094
Total		241,004	438,672

National Electrical Manufacturers Association

Electric Freezers

(Home and Farm)

Sales Billed—Units

	1952	1951	1950	1949
Jan	44,147	71,708	31,918	27,230
Feb	50,127	63,996	39,193	24,215
Mar	52,344	77,937	51,970	27,204
Apr	49,422	64,336	42,480	21,441
May	71,774	56,623	36,940	20,139
June	98,871	63,322	52,825	27,735
July	89,767	56,845	76,699	30,988
Aug	77,873	68,587	76,753	35,384
Sept	83,942	67,965	62,019	31,194
Oct		60,451	63,455	20,502
Nov		46,933	49,851	23,763
Dec		39,652	61,018	24,162
Total		738,328	645,151	313,957

National Electrical Manufacturers Association

Electric Coffee Makers, Pots & Urns

Vacuum (glass & metal) and Percolators
Sales Billed—Units

	1952	1951	1950	1949
Jan	49,927	74,886	59,096	28,626
Feb	88,678	119,689	53,961	32,556
Mar	123,320	147,935	80,977	50,156
Apr	58,158	82,672	80,979	46,077
May	69,769	60,013	69,877	38,035
June	58,503	109,168	88,608	35,750
July	59,757	48,025	63,013	21,026
Aug	91,869	85,702	128,605	31,104
Sept	157,884	82,193	171,117	59,478
Oct		84,603	150,799	80,171
Nov		78,964	137,806	85,376
Dec		57,906	111,800	75,637
Total		1,031,756	1,196,638	583,992

National Electrical Manufacturers Association

Electric Toasters

Sales Billed—Units

AUTOMATIC

	1952	1951	1950	1949
Jan	118,624	292,423	244,345	281,509
Feb	141,851	319,129	264,111	303,584
Mar	99,540	364,745	226,774	342,312
Apr	63,654	263,153	192,567	190,194
May	74,817	209,649	209,337	168,979
June	82,566	157,077	151,330	149,590
July	210,207	95,940	245,111	137,273
Aug	289,303	183,874	440,078	225,590
Sept	269,262	219,698	479,726	301,301
Oct		237,091	358,169	331,029
Nov		174,757	372,356	348,649
Dec		112,560	335,054	371,943
Total		2,630,096	3,518,958	3,151,953

NONAUTOMATIC

	1952	1951	1950	1949
Jan	1,783	8,641	12,407	9,725
Feb	2,992	10,888	11,282	20,826
Mar	1,234	7,265	10,350	11,504
Apr	1,218	3,867	5,892	8,732
May	1,130	5,260	4,942	7,019
June	927	3,719	5,629	3,646
July	1,118	3,069	8,720	4,927
Aug	9,824	9,440	35,791	12,355
Sept	3,592	12,823	26,751	17,424
Oct		11,527	33,333	34,509
Nov		10,746	18,174	24,266
Dec		5,018	22,901	21,804
Total		92,293	196,172	176,737

National Electrical Manufacturers Association

Electric Roasters

Sales Billed—Units

	1952	1951	1950	1949
Jan	28,444	33,885	25,698	29,999
Feb	23,571	51,119	36,507	40,587
Mar	28,501	55,148	23,204	21,849
Apr	32,963	35,875	20,224	11,371
May	32,172	27,360	19,300	10,123
June	23,874	21,013	25,741	15,022
July	36,875	15,015	36,972	11,480
Aug	48,382	40,494	41,792	20,918
Sept	44,984	34,138	38,785	41,285
Oct		39,572	39,271	43,540
Nov		36,890	48,084	44,255
Dec		38,776	38,096	36,960
Total		429,285	393,674	327,389

National Electrical Manufacturers Association

Electric Broilers

Sales Billed—Units

	1952	1951	1950	1949
Jan	5,232	7,245	4,438	7,011
Feb	6,950	8,082	3,320	5,792
Mar	6,181	6,981	4,097	4,650
Apr	4,770	6,088	4,178	3,275
May	5,477	2,253	3,129	2,619
June	5,705	5,735	4,364	2,617
July	7,383	1,727	5,374	1,559
Aug	8,465	3,560	10,128	1,843
Sept	5,329	5,809	12,756	2,097
Oct		7,494	8,342	7,433
Nov		8,600	10,661	5,919
Dec		7,510	6,962	3,633
Total		71,084	77,749	48,448

National Electrical Manufacturers Association

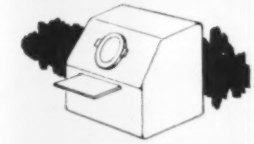
Steel Kitchen Cabinets

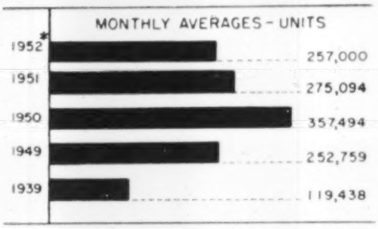
(including steel cabinet sink units)

(Factory Sales)

	Units	Retail Value
1952	2,970,000	$154,000,000
1951	2,871,000	128,850,500
1950	2,969,000	125,848,500
1949	2,658,000	105,000,000
1948	3,500,000	138,000,000

Steel Kitchen Cabinet Manufacturers Assn. Inc.





WASHERS

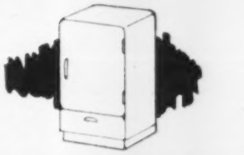
Sales Billed—Units

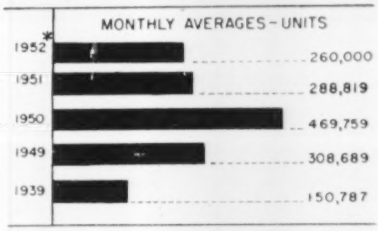
	1952	1951	1950
Jan.	213,998	321,092	275,576
Feb.	255,864	341,328	342,967
Mar.	248,431	368,455	423,802
Apr.	217,211	292,193	333,072
May	213,668	253,942	304,640
June	274,457	253,119	325,217
July	207,593	139,799	282,261
Aug.	254,537	239,081	381,452
Sept.	283,732	313,756	424,043
Oct.	327,814	297,210	439,924
Nov.	......	262,484	379,964
Dec.	......	218,664	377,013

YEARLY TOTALS

1951....	3,301,123	1948....	4,317,183
1950....	4,289,931	1947....	3,783,632
1949....	3,033,106	1946....	2,023,981

American Home Laundry Manufacturers' Association





ELECTRIC REFRIGERATORS

Domestic Sales—Units

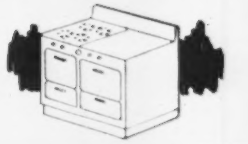
	1952	1951	1950
Jan.	260,259	465,903	364,002
Feb.	259,838	403,035	450,751
Mar.	276,972	558,503	572,691
Apr.	225,994	409,887	531,498
May	217,617	309,722	528,506
June	324,885	261,298	534,489
July	333,877	163,922	490,802
Aug.	250,224	165,309	496,486
Sept.	257,362	193,929	512,125
Oct.	......	191,519	399,330
Nov.	......	147,394	386,142
Dec.	......	195,403	370,286

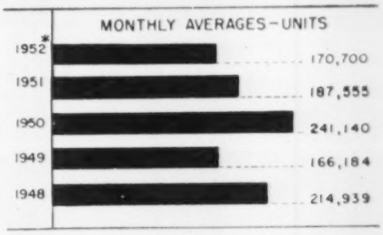
YEARLY TOTALS

1951....	3,465,824	1945....	267,061
1950....	5,637,108	1944....	40,034
1949....	3,704,269	1943....	156,697
1948....	3,976,091	1942....	378,725
1947....	2,994,297	1941....	3,303,572
1946....	1,811,326	1939....	1,809,445

National Electrical Manufacturers Assn.

* Estimated





HOUSEHOLD GAS RANGES

Shipments—Units

	1952	1951	1950
Jan.	160,574	250,571	161,651
Feb.	162,076	244,568	202,901
Mar.	180,224	279,253	257,296
Apr.	176,208	217,024	231,350
May	156,701	171,742	233,924
June	168,916	122,647	209,008
July	147,593	110,509	241,840
Aug.	169,612	158,886	314,005
Sept.	187,216	173,402	270,111
Oct.	......	195,260	290,438
Nov.	......	182,963	255,008
Dec.	......	143,831	226,149

YEARLY TOTALS

1951....	2,250,656	1948....	2,579,265
1950....	2,893,681	1947....	2,216,609
1949....	1,994,203		

U. S. Bureau of the Census

Automatic Tumbler Dryers

Factory Sales—Units

	1952	1951	1950	1949
Jan.	45,121	31,935	19,495	9,437
Feb.	44,540	36,851	19,389	9,407
Mar.	41,161	44,020	27,125	8,429
Apr.	36,109	32,960	25,140	4,458
May	28,812	32,292	16,122	3,910
June	31,720	39,908	20,568	2,496
July	33,858	26,268	23,588	2,775
Aug.	53,376	40,191	32,318	5,526
Sept.	71,516	43,752	31,399	10,806
Oct.	53,510	50,299	28,882	15,760
Nov.		52,499	33,044	17,441
Dec.		46,779	41,418	15,282
Total		486,754	318,488	105,727

American Home Laundry Manufacturers' Association

Household Electric Ranges

Domestic Sales—Units

	1952	1951	1950
Jan.	79,982	130,316	97,139
Feb.	63,063	121,585	118,059
Mar.	93,225	159,865	144,123
Apr.	69,149	118,823	131,182
May	68,117	106,685	144,093
June	86,847	106,589	156,571
July	83,465	60,530	129,072
Aug.	74,853	64,042	130,651
Sept.	62,404	93,551	152,852
Oct.		109,043	128,367
Nov.		101,476	126,303
Dec.		72,140	122,201

YEARLY TOTALS

1951	1,244,645	1945	146,046
1950	1,580,613	1944	42,712
1949	887,953	1943	8,480
1948	1,341,497	1942	161,312
1947	1,016,536	1941	683,859
1946	542,168	1939	296,846

National Electrical Manufacturers Association

Standard Vacuum Cleaners

Sales Billed—Units

	1952	1951	1950
Jan.	230,226	282,305	249,150
Feb.	235,936	261,572	263,515
Mar.	290,002	290,242	361,014
Apr.	217,169	227,216	292,664
May	216,969	201,983	278,645
June	206,939	194,548	250,190
July	188,715	161,002	279,967
Aug.	222,413	191,299	341,232
Sept.	237,541	210,086	327,524
Oct.	292,171	259,469	331,445
Nov.		219,119	265,310
Dec.		230,263	288,756

YEARLY TOTALS

1951	2,729,104	1948	3,368,108
1950	3,529,412	1947	3,800,687
1949	2,886,514	1946	2,289,441

Vacuum Cleaner Manufacturers Association

Electric Food Mixers

Sales Billed—Units

	1952†	1951	1950
Jan.	26,354	27,957	18,126
Feb.	23,665	32,409	29,716
Mar.	14,916	39,132	44,532
Apr.		48,637	26,969
May		35,953	27,251
June*		30,334	35,159
July		20,610	31,720
Aug.		22,963	65,520
Sept.		40,646	75,375
Oct.		43,957	54,996
Nov.		29,788	49,365
Dec.		21,629	51,375
Totals		393,955	510,104

† Data available for first three months only.

National Electrical Manufacturers Association

Electric Flat Irons

Sales Billed—Units

	1952	1951	1950
January	282,598	379,810	201,523
February	421,157	536,684	410,041
March	441,172	635,350	509,606
April	241,028	645,571	339,091
May	272,712	561,284	446,173
June	336,645	571,741	437,697
July	403,283	293,867	423,170
August	626,711	400,494	564,887
September	537,553	645,620	686,114
October		387,323	522,765
November		423,621	577,586
December		531,362	747,922
Total		6,012,727	5,866,575

YEARLY TOTAL

1949 3,935,185

National Electrical Manufacturers Association

Electric Water Heaters

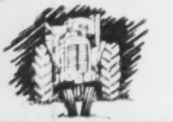
Domestic Unit Sales of Storage Tank Type

	1952	1951	1950
January	37,178	73,067	43,842
February	42,677	58,720	52,249
March	45,507	82,830	63,932
April	44,935	69,524	61,950
May	42,795	67,805	65,645
June	49,830	55,769	75,509
July	45,490	43,285	63,463
August	43,580	42,970	74,380
September	56,365	40,432	79,383
October		51,533	76,087
November		40,463	71,685
December		35,063	70,562

YEARLY TOTALS

1951	661,459	1945	129,722
1950	798,687	1944	31,527
1949	508,844	1943	24,720
1948	706,389	1942	80,986
1947	817,717	1941	177,042
1946	299,826	1939	89,777

National Electrical Manufacturers Association



FARM MACHINERY AND EQUIPMENT

Manufacturers' Shipments

U. S. Bureau of the Census

Complete Units—Totals

	Total	Domestic	Export
1951	$1,758,952,000	$1,541,187,000	$217,765,000
1950	1,437,824,000	1,258,341,000	179,483,000
1949	1,424,068,000	1,219,220,000	204,848,000
1948	1,334,345,000	1,162,306,000	172,039,000
1947	975,988,126	852,037,940	123,950,186
1946	622,673,570	557,568,157	65,105,413
1945	490,504,558	426,552,593	63,951,965
1944	432,047,723	386,127,862	45,919,861

COMPLETE UNITS—BY PRODUCT GROUPS

Plows and Listers

	Total	Domestic	Export
1951	$75,815,000	$63,747,000	$12,068,000
1950	67,487,000	56,947,000	10,540,000
1949	66,694,000	52,812,000	13,882,000
1948	67,353,000	57,332,000	10,021,000
1947	52,596,324	45,439,275	7,157,049
1946	30,585,670	26,968,841	3,616,829
1945	22,116,982	18,926,438	3,190,544
1944	18,380,210	16,095,878	2,284,332

Harrows, Rollers, Pulverizers, Stalk Cutters

1951	$80,079,000	$73,975,000	$6,104,000
1950	68,119,000	62,209,000	5,910,000
1949	66,939,000	60,709,000	6,230,000
1948	71,478,000	67,677,000	3,801,000
1947	47,731,481	42,796,049	4,935,432
1946	29,197,577	27,810,881	1,386,696
1945	17,170,119	16,097,799	1,072,320
1944	16,899,791	16,141,245	758,546

Planting, Seeding, and Fertilizing Machinery

1951	$108,528,000	$103,181,000	$5,347,000
1950	91,429,000	87,013,000	4,416,000
1949	89,166,000	85,371,000	3,795,000
1948	87,505,000	83,844,000	3,661,000
1947	57,678,819	54,743,355	2,935,464
1946	41,683,390	40,395,600	1,287,790
1945	32,055,195	30,869,192	1,186,003
1944	26,063,969	24,760,059	1,303,910

Cultivators and Weeders

1951	$63,735,000	$59,956,000	$3,779,000
1950	43,251,000	40,066,000	3,185,000
1949	52,518,000	48,820,000	3,698,000
1948	57,361,000	53,710,000	3,651,000
1947	36,101,723	33,906,154	2,195,569
1946	23,291,144	22,117,244	1,173,900
1945	23,486,010	22,002,201	1,483,809
1944	22,149,353	21,318,628	830,725

Sprayers and Dusters

1951	$35,892,000	$31,907,000	$3,985,000
1950	31,244,000	27,086,000	4,158,000
1949	27,574,000	24,357,000	3,217,000
1948	39,158,000	34,406,000	4,752,000
1947	34,793,025	30,921,780	3,871,245
1946	23,352,657	21,382,580	1,970,077
1945	12,226,475	11,436,951	789,524
1944	10,840,828	10,077,078	763,750

Harvesting Machinery

	Total	Domestic	Export
1951	$284,867,000	$259,024,000	$25,843,000
1950	241,629,000	221,530,000	20,099,000
1949	232,933,000	213,603,000	19,330,000
1948	189,937,000	172,691,000	17,246,000
1947	140,946,122	127,681,459	13,264,663
1946	75,969,443	70,426,481	5,542,962
1945	65,631,426	60,827,560	4,803,866
1944	51,600,575	48,083,068	3,517,507

Haying Machinery

1951	$175,556,000	$165,036,000	$10,520,000
1950	132,355,000	125,303,000	7,052,000
1949	127,847,000	118,064,000	9,783,000
1948	127,529,000	118,132,000	9,397,000
1947	72,506,586	67,446,450	5,060,136
1946	44,535,342	42,012,807	2,522,535
1945	33,662,612	31,786,341	1,876,271
1944	31,029,859	29,823,550	1,206,309

Machines for Preparing Crops for Market or for Use

1951	$24,041,000	$20,397,000	$3,644,000
1950	22,007,000	18,782,000	3,225,000
1949	24,724,000	21,291,000	3,433,000
1948	30,801,000	26,874,000	3,927,000
1947	32,615,682	29,738,585	2,877,097
1946	27,939,738	26,170,212	1,769,526
1945	18,105,070	17,231,361	873,709
1944	16,221,950	15,492,631	729,319

Farm Poultry Equipment

1951	$31,654,000	$30,655,000	$999,000
1950	26,858,000	26,206,000	652,000
1949	23,020,000	22,240,000	780,000
1948	18,738,000	17,919,000	819,000
1947	19,156,835	18,283,341	873,494
1946	22,284,761	21,559,062	725,699
1945	22,600,662	22,362,480	238,182
1944	19,209,782	19,030,217	179,565

Farm Dairy Machines and Equipment

1951	$13,063,000	$12,121,000	$942,000
1950	14,624,000	13,462,000	1,162,000
1949	13,621,000	11,896,000	1,725,000
1948	17,246,000	15,102,000	2,144,000
1947	24,654,642	22,143,586	2,511,056
1946	32,199,747	30,136,990	2,062,757
1945	34,056,429	32,804,454	1,251,975
1944	25,543,623	24,381,455	1,162,168

Barn Equipment

	Total	Domestic	Export
1951	$11,832,000	$11,815,000	$17,000
1950	9,582,000	9,567,000	15,000
1949	8,154,000	8,134,000	20,000
1948	12,195,000	12,174,000	21,000
1947	10,901,480	10,893,727	7,753
1946	8,640,207	8,633,523	6,684
1945	6,005,136	6,002,788	2,348
1944	5,975,307	5,972,458	2,849

Barnyard Equipment

1951	$20,964,000	$20,898,000	$66,000
1950	17,123,000	17,088,000	35,000
1949	13,102,000	13,059,000	43,000
1948	10,721,000	10,691,000	30,000
1947	8,621,632	8,599,384	22,248
1946	8,648,055	8,536,254	111,801
1945	7,861,272	7,855,047	6,225
1944	6,978,793	6,966,041	12,752

Farm Elevators and Blowers

1951	$34,521,000	$33,701,000	$820,000
1950	30,594,000	29,744,000	850,000
1949	29,122,000	28,669,000	453,000
1948	22,313,000	22,200,000	113,000
1947	14,298,722	14,169,363	129,359
1946	8,535,790	8,483,852	51,938
1945	5,463,754	5,442,827	20,927
1944	3,675,954	3,665,985	9,969

Farm Wagons, Trucks, and Other Farm Transportation Equipment

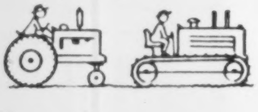
1951	$26,809,000	$25,524,000	$1,285,000
1950	20,939,000	19,425,000	1,514,000
1949	20,140,000	18,870,000	1,270,000
1948	34,306,000	32,562,000	1,744,000
1947	31,173,525	28,973,090	2,200,435
1946	23,970,305	23,423,231	547,074
1945	12,485,216	12,142,120	343,096
1944	7,385,187	7,294,177	91,010

Tractors for Farm Use

1951	$771,596,000	$629,250,000	$142,346,000
1950	620,583,000	503,913,000	116,670,000
1949	628,514,000	491,325,000	137,189,000
1948	547,704,000	436,992,000	110,712,000
1947	392,211,528	316,302,342	75,909,186
1946	221,839,744	179,510,599	42,329,145
1945	177,578,200	130,765,034	46,813,166
1944	170,152,542	137,085,392	33,067,150

TRACTORS

Manufacturers' Shipments



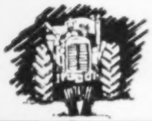
U. S. Bureau of the Census

WHEEL TYPE—Farm Use

Year	Number	Value
1951	545,663	$680,423,000
1950	490,539	535,374,000
1949	534,946	543,005,000
1948	510,847	468,083,292
1947	413,783	331,652,526
1946	243,271	180,362,770
1945	224,985	153,170,002
1944	235,453	157,518,924

WHEEL TYPE—Non-Farm Use

Year	Number	Value
1951	14,310	$77,578,000
1950	9,378	38,921,000
1949	10,422	29,425,000
1948	18,845	29,215,151
1947	14,882	17,681,997
1946	12,067	11,909,354
1945	18,707	15,725,730
1944	14,502	12,593,984



Farm Equipment

METALWORKING FACTS AND FIGURES

Attachments and Parts—Totals

	Total	Domestic	Export
1951	$445,835,000	$376,559,000	$69,276,000
1950	354,603,000	303,834,000	50,769,000
1949	388,940,000	331,714,000	57,226,000
1948	399,401,000	351,307,000	48,094,000
1947	318,697,725	280,647,520	38,050,205
1946	227,804,033	205,662,331	22,141,702
1945	209,672,797	186,042,806	23,629,991
1944	185,332,814	163,182,909	22,149,905

Farm Machinery and Equipment

	Total	Domestic	Export
1951	$2,204,787,000	$1,917,746,000	$287,041,000
1950	1,792,427,000	1,562,175,000	230,252,000
1949	1,813,008,000	1,550,934,000	262,074,000
1948	1,733,746,000	1,513,613,000	220,133,000
1947	1,294,685,851	1,132,685,460	162,000,391
1946	850,477,603	763,230,488	87,247,115
1945	700,177,355	612,595,399	87,581,956
1944	617,380,537	549,310,771	68,069,766

ATTACHMENTS AND PARTS—BY PRODUCT GROUPS

Plows and Listers

	Total	Domestic	Export
1951	$36,293,000	$32,787,000	$3,506,000
1950	32,839,000	29,532,000	3,307,000
1949	33,280,000	29,575,000	3,705,000
1948	33,252,000	30,238,000	3,014,000
1947	30,932,933	28,106,130	2,826,803
1946	20,107,832	18,846,348	1,261,484
1945	18,045,596	16,446,673	1,598,923
1944	17,505,518	15,915,945	1,589,573

Harrows, Rollers, Pulverizers, Stalk Cutters

1951	$13,513,000	$12,426,000	$1,087,000
1950	9,597,000	8,557,000	1,040,000
1949	9,921,000	9,089,000	832,000
1948	9,476,000	9,071,000	405,000
1947	9,691,421	9,154,751	536,670
1946	7,436,387	7,153,826	282,561
1945	5,428,470	5,278,585	149,885
1944	5,614,332	5,384,992	229,340

Planting, Seeding, and Fertilizing Machinery

1951	$25,172,000	$23,684,000	$1,488,000
1950	21,624,000	20,455,000	1,169,000
1949	25,709,000	24,000,000	1,709,000
1948	22,000,000	21,079,000	921,000
1947	16,298,538	15,202,033	1,096,505
1946	12,154,142	11,693,405	460,737
1945	11,230,810	10,785,620	445,190
1944	9,106,246	8,733,305	372,941

Cultivators and Weeders

1951	$17,906,000	$16,689,000	$1,217,000
1950	14,002,000	12,971,000	1,031,000
1949	17,651,000	16,401,000	1,250,000
1948	22,708,000	21,512,000	1,196,000
1947	14,261,456	13,522,678	738,778
1946	10,650,655	10,307,610	343,045
1945	10,080,756	9,708,607	372,149
1944	8,563,455	8,284,121	279,334

Sprayers and Dusters

1951	$6,638,000	$5,811,000	$827,000
1950	5,535,000	4,793,000	742,000
1949	4,585,000	3,967,000	618,000
1948	5,300,000	4,698,000	602,000
1947	4,762,486	4,401,061	361,425
1946	2,927,284	2,600,123	327,161
1945	2,488,806	2,259,214	229,592
1944	2,243,889	2,050,993	192,896

Harvesting Machinery

	Total	Domestic	Export
1951	$60,217,000	$54,053,000	$6,164,000
1950	46,524,000	41,887,000	4,637,000
1949	57,622,000	52,371,000	5,251,000
1948	57,883,000	53,755,000	4,128,000
1947	50,624,285	47,000,990	3,623,295
1946	37,755,724	35,515,105	2,240,619
1945	33,729,501	31,442,483	2,287,018
1944	28,185,173	26,504,864	1,680,309

Haying Machinery

1951	$33,990,000	$31,579,000	$2,411,000
1950	22,624,000	21,257,000	1,367,000
1949	23,944,000	22,382,000	1,562,000
1948	25,866,000	24,103,000	1,763,000
1947	22,358,038	20,471,525	1,886,513
1946	15,319,554	14,338,547	981,007
1945	15,793,396	14,672,695	1,120,701
1944	13,712,958	12,755,768	957,190

Machines for Preparing Crops for Market or for Use

1951	$12,365,000	$10,781,000	$1,584,000
1950	8,545,000	7,473,000	1,072,000
1949	10,659,000	9,460,000	1,199,000
1948	11,415,000	10,178,000	1,237,000
1947	9,396,860	8,397,290	999,570
1946	8,106,300	7,372,080	734,220
1945	7,124,969	6,499,718	625,251
1944	5,089,611	4,766,183	323,428

Farm Poultry Equipment

1951	$2,957,000	$2,885,000	$72,000
1950	3,269,000	3,221,000	48,000
1949	2,325,000	2,266,000	59,000
1948	1,641,000	1,604,000	37,000
1947	1,444,721	1,402,588	42,133
1946	1,640,531	1,612,933	27,598
1945	2,267,163	2,248,993	18,170
1944	2,116,611	2,067,958	48,653

Farm Dairy Machines and Equipment

1951	$9,247,000	$8,547,000	$700,000
1950	8,345,000	7,443,000	902,000
1949	6,436,000	5,639,000	797,000
1948	6,197,000	5,501,000	696,000
1947	6,760,753	6,054,092	706,661
1946	9,352,856	8,350,156	1,002,700
1945	12,695,795	12,023,449	672,346
1944	10,583,569	9,890,591	692,978

Barn Equipment

	Total	Domestic	Export
1951	$1,887,000	$1,887,000	......
1950	1,718,000	1,714,000	$4,000
1949	1,896,000	1,893,000	3,000
1948	1,012,000	1,012,000	......
1947	901,075	900,551	524
1946	913,416	913,192	224
1945	1,081,712	1,081,649	63
1944	1,010,270	1,009,881	389

Barnyard Equipment

1951	$677,000	$676,000	$1,000
1950	654,000	651,000	3,000
1949	396,000	396,000	......
1948	194,000	194,000	......
1947	185,881	185,770	111
1946	196,352	195,725	627
1945	225,766	225,441	325
1944	204,966	204,594	372

Farm Elevators and Blowers

1951	$4,857,000	$4,719,000	$138,000
1950	4,077,000	4,011,000	66,000
1949	3,613,000	3,572,000	41,000
1948	2,998,000	2,973,000	25,000
1947	2,090,072	2,074,385	15,687
1946	2,059,535	2,057,593	1,942
1945	680,838	677,533	3,305
1944	908,784	906,426	2,358

Farm Wagons, Trucks, and Other Farm Transportation Equipment

1951	$6,187,000	$5,788,000	$399,000
1950	5,164,000	4,823,000	341,000
1949	4,199,000	3,936,000	263,000
1948	4,612,000	4,337,000	275,000
1947	4,840,844	4,572,705	268,139
1946	4,500,040	4,284,631	215,409
1945	3,378,514	3,290,915	87,599
1944	3,527,750	3,380,382	147,368

Tractors for Farm Use

1951	$213,929,000	$164,247,000	$49,682,000
1950	170,086,000	135,046,000	35,040,000
1949	186,704,000	146,767,000	39,937,000
1948	194,847,000	161,052,000	33,795,000
1947	144,148,362	119,200,971	24,947,391
1946	94,683,425	80,421,057	14,262,368
1945	85,420,705	69,401,231	16,019,474
1944	76,959,682	61,326,906	15,632,776

TRACKLAYING TYPE—Farm Use

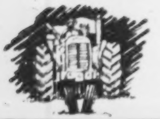
Year	Number	Value
1951	20,153	$66,415,000
1950	18,978	62,960,000
1949	20,043	64,481,432
1948	17,365	49,569,066
1947	11,630	28,332,401
1946	8,898	18,117,637
1945	11,149	20,973,907
1944	6,221	10,414,553

TRACKLAYING TYPE—Non-Farm Use

Year	Number	Value
1951	28,989	$193,545,000
1950	25,622	160,527,000
1949	23,806	134,941,835
1948	22,208	112,437,953
1947	25,904	105,997,470
1946	17,367	64,816,042
1945	32,849	191,033,573
1944	38,966	250,168,422

GARDEN TYPE—Farm and Non-Farm

Year	Number	Value
1951	168,352	$24,758,000
1950	153,827	22,249,000
1949	131,427	21,028,000
1948	169,421	30,052,000
1947	172,252	33,151,065
1946	115,241	23,925,724
1945	27,962	3,592,299
1944	16,852	2,288,853



Farm Equipment

DOMESTIC WATER SYSTEMS

Factory Shipments

Jet Pump Systems

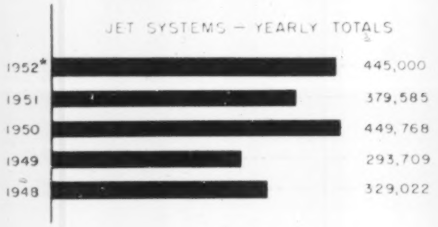
	Units	Value
1952*	445,000	....
Jan.	28,399	$2,833,000
Feb.	30,507	2,946,000
Mar.	28,782	2,691,000
Apr.	33,062	3,160,000
May	35,193	3,443,000
June	38,567	3,708,000
July	41,637	4,047,000
Aug.	45,209	4,464,000
Sept.	43,348	4,164,000
Oct.	......	....
Nov.	......	....
1951	379,585	$37,652,000
Jan.	40,362	3,988,000
Feb.	44,500	4,337,000
Mar.	42,186	4,161,000
Apr.	35,507	3,543,000
May	30,168	2,957,000
June	24,035	2,352,000
July	22,771	2,279,000
Aug.	27,701	2,842,000
Sept.	27,691	2,726,000
Oct.	33,526	3,349,000
Nov.	30,923	3,053,000
Dec.	20,215	2,065,000
1950	449,768	$38,935,000
1949	293,599	24,313,000
1948	329,022	27,519,000
1947	361,140	29,694,000
1946	318,758	24,134,000

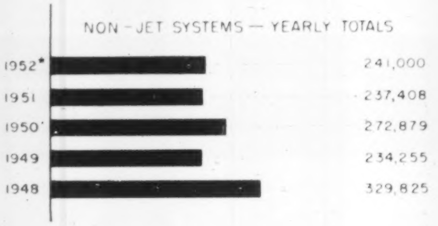
U. S. Bureau of the Census

Non-Jet Pump Systems

	Units	Value
1952*	241,000	....
Jan.	17,505	$1,683,000
Feb.	19,874	1,924,000
Mar.	18,940	1,888,000
Apr.	20,466	2,126,000
May	19,059	1,812,000
June	19,792	2,005,000
July	20,822	1,929,000
Aug.	22,190	2,006,000
Sept.	22,585	2,129,000
Oct.	......	....
Nov.	......	....
1951	237,408	$22,303,000
Jan.	21,334	1,996,000
Feb.	25,279	2,180,000
Mar.	24,868	2,196,000
Apr.	24,533	2,349,000
May	23,089	2,042,000
June	17,877	1,635,000
July	15,251	1,464,000
Aug.	17,784	1,705,000
Sept.	17,177	1,677,000
Oct.	19,962	1,903,000
Nov.	18,094	1,931,000
Dec.	12,160	1,225,000
1950	272,879	$21,269,000
1949	234,365	17,563,000
1948	329,825	23,653,000
1947	401,715	26,123,000
1946	306,971	16,640,000

* Estimated





Domestic Hand and Windmill Pumps

Factory Shipments

1952	Units	Value
Jan.	22,038	$147,000
Feb.	24,835	166,000
Mar.	16,345	143,000
Apr.	18,413	151,000
May	17,650	142,000
June	18,034	139,000
July	18,619	141,000
Aug.	21,312	145,000
Sept.	26,921	202,000
Oct.	......	....
1951	245,791	$1,721,000
Jan.	29,072	197,000
Feb.	30,871	227,000
Mar.	28,691	215,000
Apr.	20,160	167,000
May	15,071	112,000
June	16,443	100,000
July	16,237	93,000
Aug.	18,653	115,000
Sept.	21,787	123,000
Oct.	22,878	145,000
Nov.	14,070	123,000
Dec.	11,858	107,000

YEARLY TOTALS

	Units	Value
1951	245,791	$1,721,000
1950	334,357	1,941,000
1949	327,415	2,186,000
1948	456,650	2,892,000
1947	368,532	2,322,000
1946	313,023	1,623,000
1945	314,638	1,689,000
1944	380,240	1,955,000
1943	368,249	1,730,000
1942	377,331	1,631,000
1941	490,586	1,896,000
1940	420,941	1,553,000
1939	515,083	1,579,000
1938	383,131	1,337,000
1937	497,498	1,678,000
1936	531,356	1,742,000
1935	367,008	1,152,000
1934	388,840	1,200,000
1933	331,001	869,000
1932	225,736	766,000
1931	325,611	1,337,000
1930	395,166	2,079,000
1929	450,287	2,344,000
1928	465,824	2,310,000

U. S. Bureau of the Census

Pump Jacks

Factory Shipments

1952	Units	Value
Jan.	3,515	$103,000
Feb.	2,906	84,000
Mar.	1,941	60,000
Apr.	1,874	65,000
May	1,541	47,000
June	1,631	49,000
July	2,562	79,000
Aug.	2,812	88,000
Sept.	2,546	84,000
Oct.	......	....
1951	37,461	$1,150,000
Jan.	5,400	140,000
Feb.	4,401	126,000
Mar.	4,321	140,000
Apr.	4,512	150,000
May	2,470	78,000
June	2,463	76,000
July	2,321	76,000
Aug.	2,936	99,000
Sept.	2,300	68,000
Oct.	2,116	65,000
Nov.	2,091	68,000
Dec.	2,130	64,000

YEARLY TOTALS

	Units	Value
1951	37,461	$1,150,000
1950	43,237	1,187,000
1949	36,854	1,034,000
1948	41,952	1,083,000
1947	54,187	1,450,000
1946	89,460	2,257,000
1945	62,451	1,418,000
1944	56,550	1,230,000
1943	31,065	640,000
1942	55,665	906,000
1941	59,058	856,000
1940	47,842	630,000
1939	37,133	464,000
1938	30,198	362,000
1937	37,029	425,000
1936	35,163	300,000
1935	20,800	161,000
1934	n.a.	n.a.
1933	n.a.	n.a.
1932	n.a.	n.a.
1931	24,803	215,000
1930	40,269	320,000
1929	42,850	361,000
1928	42,518	364,000
1927	39,665	367,000
1926	45,050	381,000

n.a. Not available.
U. S. Bureau of the Census

Windmill Towers

Factory Shipments

1952	Units	Value
Jan.	741	$65,000
Feb.	612	54,000
Mar.	644	57,000
Apr.	825	74,000
May	597	55,000
June	531	55,000
July	638	55,000
Aug.	642	56,000
Sept.	540	61,000
Oct.	......	....
1951	9,416	$834,000
Jan.	789	71,000
Feb.	933	81,000
Mar.	1,171	107,000
Apr.	926	81,000
May	632	55,000
June	599	51,000
July	716	63,000
Aug.	935	81,000
Sept.	801	72,000
Oct.	817	73,000
Nov.	674	62,000
Dec.	423	37,000

YEARLY TOTALS

	Units	Value
1951	9,416	$834,000
1950	9,092	788,000
1949	9,843	901,000
1948	19,115	1,430,000
1947	22,269	1,351,000
1946	22,416	1,043,000
1945	20,603	863,000
1944	18,236	727,000
1943	11,632	480,000
1942	11,373	468,000
1941	14,950	670,000
1940	14,647	641,000
1939	17,418	808,000
1938	16,898	662,000
1937	20,992	895,000
1936	22,366	815,000
1935	17,015	627,000
1934	n.a.	n.a.
1933	n.a.	n.a.
1932	n.a.	n.a.
1931	11,357	445,000
1930	26,058	1,009,000
1929	35,894	1,355,000
1928	50,215	1,433,000
1927	44,334	1,330,000
1926	57,571	1,397,000

n.a. Not available.
U. S. Bureau of the Census

Windmill Heads

Factory Shipments

1952	Units	Value
Jan.	1,149	$112,000
Feb.	1,252	110,000
Mar.	1,068	118,000
Apr.	1,635	153,000
May	1,377	123,000
June	1,363	111,000
July	1,372	113,000
Aug.	1,268	99,000
Sept.	1,070	93,000
Oct.	......	....
1951	16,700	$1,497,000
Jan.	1,487	133,000
Feb.	1,751	154,000
Mar.	1,857	176,000
Apr.	1,760	156,000
May	1,220	96,000
June	1,092	103,000
July	1,258	119,000
Aug.	1,456	118,000
Sept.	1,380	125,000
Oct.	1,438	138,000
Nov.	1,225	107,000
Dec.	776	72,000

YEARLY TOTALS

	Units	Value
1951	16,700	$1,497,000
1950	20,736	1,674,000
1949	19,188	1,675,000
1948	31,835	2,183,000
1947	39,076	2,424,000
1946	46,004	2,113,000
1945	41,761	1,786,000
1944	40,540	1,699,000
1943	34,523	1,537,000
1942	37,642	1,624,000
1941	43,159	1,757,000
1940	45,787	1,755,000
1939	52,706	2,100,000
1938	46,455	1,923,000
1937	63,753	2,529,000
1936	70,125	2,508,000
1935	51,513	1,884,000
1934	57,836	1,981,000
1933	n.a.	n.a.
1932	n.a.	n.a.
1931	37,523	1,295,000
1930	69,793	2,554,000
1929	94,030	3,949,000
1928	99,050	3,944,000
1927	83,866	3,503,000
1926	82,205	3,129,000

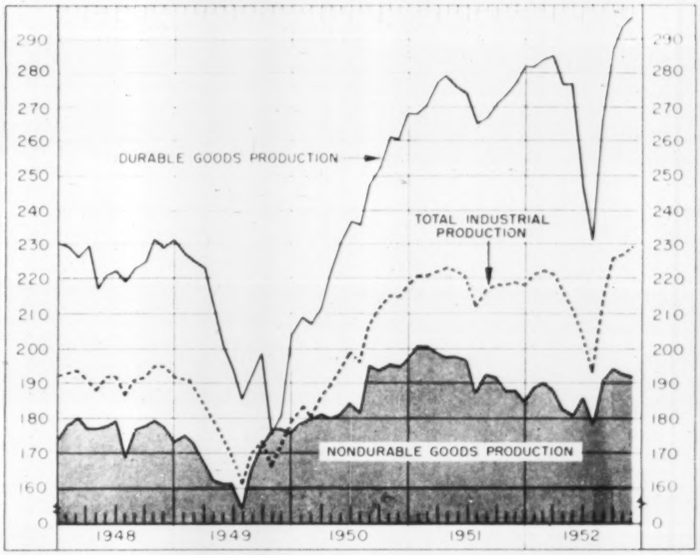
n.a. Not available.
U. S. Bureau of the Census

Business Indexes

METALWORKING FACTS AND FIGURES

INDEXES OF INDUSTRIAL PRODUCTION

FEDERAL RESERVE BOARD—1935-1939 = 100



Total Industrial Production

Adjusted for Seasonal Variation

	1952	1951	1950	1949	1948
Jan.	221	221	183	191	193
Feb.	222	221	180	189	194
Mar.	221	222	187	184	191
Apr.	216	223	190	179	188
May	211	222	195	174	192
June	204	221	199	169	192
July	193	212	196	161	186
Aug.	215	217	209	170	191
Sept.	225	218	211	174	192
Oct.	226	218	216	166	195
Nov.	227	219	215	173	195
Dec.	229	218	218	179	192

YEARLY INDEXES—UNADJUSTED

1952*	218	1947	187	1942	199
1951	220	1946	170	1941	162
1950	200	1945	203	1940	125
1949	176	1944	235	1939	109
1948	192	1943	239		

Iron and Steel

Adjusted for Seasonal Variation

	1952	1951	1950	1949	1948
Jan.	261	255	203	228	203
Feb.	261	252	201	232	203
Mar.	263	263	205	233	207
Apr.	245	264	222	219	177
May	246	263	226	204	208
June	142	261	231	177	208
July	141	253	228	156	201
Aug.	241	254	236	175	207
Sept.	267	258	245	179	214
Oct.	276	261	253	102	221
Nov.		261	246	145	224
Dec.		263	253	201	223

Nonferrous Metals and Products Output

Adjusted for Seasonal Variation

	1952	1951	1950	1949	1948
Jan.	216	224	180	183	195
Feb.	217	217	190	185	199
Mar.	218	209	201	183	201
Apr.	218	211	198	167	200
May	216	206	197	145	196
June	210	205	206	133	193
July	202	199	202	127	185
Aug.	212	197	212	141	186
Sept.	221	196	216	157	192
Oct.	228	201	223	164	192
Nov.		209	226	163	188
Dec.		207	227	167	184

Durable Goods

Adjusted for Seasonal Variation

	1952	1951	1950	1949	1948
Jan.	282	268	209	227	229
Feb.	284	271	207	225	226
Mar.	285	277	211	223	229
Apr.	277	279	222	212	217
May	277	276	231	201	221
June	248	274	237	194	222
July	231	265	235	185	219
Aug.	266	267	247	193	223
Sept.	287	271	251	199	225
Oct.	294	274	261	175	231
Nov.		277	260	181	229
Dec.		282	268	203	231

Nondurable Goods

Adjusted for Seasonal Variation

	1952	1951	1950	1949	1948
Jan.	189	201	179	175	178
Feb.	190	201	180	173	180
Mar.	188	199	181	168	177
Apr.	183	198	180	162	177
May	181	198	181	161	178
June	186	197	184	161	179
July	179	187	181	154	169
Aug.	191	193	195	165	177
Sept.	194	192	194	172	178
Oct.	193	188	196	177	179
Nov.		188	195	177	178
Dec.		185	197	176	173

Consumers' Price Index

Cost of Living. 1935-1939=100

	1952	1951	1950	1949
January	189.1	181.5	168.2	171.7
February	187.9	183.8	167.9	169.9
March	188.0	184.5	168.4	170.4
April	188.7	184.6	168.5	170.7
May	189.0	185.4	169.3	170.2
June	189.6	185.2	170.2	170.6
July	190.8	185.5	172.0	169.6
August	191.1	185.5	173.4	169.9
September	190.8	186.6	174.6	170.7
October	190.9	187.4	175.6	169.7
November	....	188.6	176.4	169.8
December	....	189.1	178.8	168.8

MONTHLY AVERAGES

1952*	189.8	1945	128.6
1951	185.6	1944	125.7
1950	171.9	1943	123.7
1949	170.2	1942	116.6
1948	171.9	1941	105.2
1947	159.6	1940	100.2
1946	139.5	1939	99.4

U. S. Bureau of Labor Statistics

Wholesale Price Indexes

1947-1949=100

ALL COMMODITIES
1952

Jan.	113.0	July	111.8
Feb.	112.5	Aug.	112.2
Mar.	112.3	Sept.	111.8
Apr.	111.8	Oct.	111.2
May	111.6	Nov.	....
June	111.2	Dec.	....

ALL COMMODITIES OTHER THAN FARM PRODUCTS AND FOOD
1952

Jan.	114.3	July	112.5
Feb.	114.2	Aug.	113.0
Mar.	113.8	Sept.	113.2
Apr.	113.3	Oct.	113.1
May	113.0	Nov.	....
June	112.6	Dec.	....

1926=100

ALL COMMODITIES

	1951	1950	1949	1948
Jan.	180.2	151.4	160.7	165.9
Feb.	183.7	152.8	158.4	161.0
Mar.	184.0	152.7	158.6	161.6
Apr.	183.6	152.8	157.1	163.0
May	182.9	155.9	155.8	164.2
June	181.7	157.3	154.5	166.4
July	179.4	162.9	153.6	168.8
Aug.	178.0	166.4	152.9	169.8
Sept.	177.6	169.5	153.5	168.9
Oct.	178.1	169.1	152.2	165.4
Nov.	178.3	171.7	151.6	164.0
Dec.	177.8	175.3	151.2	162.4

MANUFACTURED PRODUCTS

	1951	1950	1949	1948
Jan.	173.3	148.1	156.1	158.0
Feb.	175.6	149.1	154.3	154.7
Mar.	175.9	148.8	154.4	156.0
Apr.	176.1	149.3	153.1	157.7
May	176.2	152.1	151.6	158.6
June	175.6	153.5	150.6	159.7
July	175.1	158.0	149.8	162.7
Aug.	174.4	161.2	149.4	164.6
Sept.	174.2	164.0	150.1	164.0
Oct.*	174.3	163.5	149.1	160.3
Nov.	174.1	165.1	148.2	158.8
Dec.	173.9	169.0	147.9	157.6

U. S. Bureau of Labor Statistics

* Estimated

METALWORKING FACTS AND FIGURES

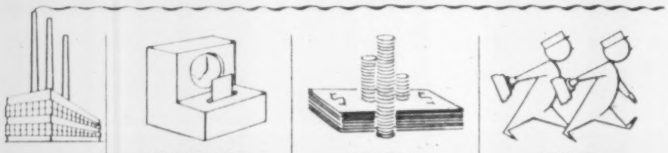
METALWORKING WAGES & HOURS (Production Workers)

(Average Hourly Wages and Average Weekly Hours)

	PRIMARY METALS		FABRICATED METAL PRODUCTS		MACHINERY Except Electrical		ELECTRICAL MACHINERY		TRANSPORTATION EQUIPMENT		INSTRUMENTS Related Products	
	Wages	Hours	Wages	Hours	Wages	Hours	Wages	Hours	Wages	Hours	Wages	Hours
1952												
Jan.	$1.852	41.5	$1.700	41.8	$1.818	43.9	$1.676	41.9	$1.915	41.5	$1.687	42.1
Feb.	1.841	41.2	1.705	41.8	1.828	43.6	1.681	41.6	1.914	41.4	1.703	41.7
Mar.	1.849	41.4	1.713	41.7	1.839	43.5	1.697	41.5	1.939	41.3	1.714	41.7
Apr.	1.834	39.0	1.711	40.7	1.837	42.8	1.696	40.7	1.928	40.7	1.708	41.4
May	1.841	39.2	1.718	41.3	1.843	42.9	1.697	40.6	1.936	41.1	1.718	41.8
June	1.830	40.1	1.716	40.9	1.847	42.7	1.705	40.9	1.944	40.7	1.730	41.6
July	1.824	39.6	1.700	39.9	1.837	41.9	1.707	40.0	1.922	39.4	1.731	40.8
Aug.	1.937	40.9	1.724	40.8	1.845	42.2	1.716	40.9	1.948	40.2	1.733	41.5
Sept.	2.003	41.8	1.764	41.8	1.866	42.6	1.724	41.9	2.017	42.4	1.759	42.2
Oct.	2.014	43.0	1.778	42.0	1.877	42.7	1.732	41.9	2.030	42.5	1.787	42.8
1951 (Av.)	1.810	41.5	1.663	41.7	1.764	43.5	1.615	41.4	1.857	40.8	1.632	42.2
1950 (Av.)	1.648	40.8	1.532	41.4	1.608	41.8	1.480	41.1	1.736	41.0	1.476	41.2

U. S. Department of Labor

METALWORKING PRODUCTION WORKERS



	HOURS PER WEEK (average)	HOURLY EARNINGS (average)	ANNUAL EMPLOYMENT (average)
1952*	41.3 HOURS	$1.815	5,301,000
1951	41.8 HOURS	$1.754	5,377,000
1950	41.2 HOURS	$1.610	4,735,000

METALWORKING EMPLOYMENT

(All Wage and Salary Workers, in Thousands)

	TOTAL	Primary Metals	Fabricated Metal Products	Machinery Except Electrical	Electrical Machinery	Transportation Equip.	Instruments etc.
1952							
Jan.	6,828	1,354	986	1,647	965	1,560	316
Feb.	6,871	1,354	989	1,655	970	1,584	319
Mar.	6,887	1,350	989	1,658	967	1,602	321
Apr.	6,900	1,338	990	1,660	960	1,629	323
May	6,887	1,335	981	1,648	955	1,648	320
June	6,441	899	954	1,640	956	1,670	322
July	6,131	860	911	1,581	937	1,522	320
Aug.	6,677	1,305	954	1,577	963	1,553	325
Sept.	6,905	1,343	991	1,577	1,000	1,666	328
Oct.	7,002	1,343	1,008	1,589	1,028	1,699	335
Nov.							
1951 (Av.)	6,690	1,345	1,007	1,591	937	1,511	299
1950 (Av.)	5,864	1,220	933	1,352	836	1,273	250

U. S. Department of Labor

* Estimated.

Steel Industry's Minimum Labor Rates

	Hourly wage (cents)	Per cent over 1915
1915	20.0	....
February 1, 1916	22.0	10.0
May 1, 1916	25.0	25.0
December 15, 1916	27.5	37.5
May 1, 1917	30.0	50.0
October 1, 1917	33.0	65.0
April 16, 1918	38.0	90.0
August 1, 1918	42.0	110.0
October 1, 1918	46.2	131.0
February 1, 1920	50.6	153.0
May 16, 1921	40.5	102.5
July 16, 1921	37.0	85.0
August 29, 1921	30.0	50.0
September 1, 1922	36.0	80.0
April 16, 1923	40.0	100.0
August, 1923	44.0	120.0
October 1, 1931	39.6	98.0
May 16, 1932	33.7	68.5
August 19, 1933 (NRA)	40.0	100.0
April 1, 1934	44.0	120.0
November, 1936	52.5	162.5
March, 1937	62.5	212.5
April, 1941	72.5	262.5
July, 1942	78.0	290.0
February 1946	96.5	382.5
April, 1947	109.0	445.0
July 16, 1948	118.5	492.5
December 1, 1950	131.0	555.0
March 1, 1952	143.5	617.5

Compiled by STEEL

Work Stoppages

1952	Number of Stoppages in Effect	Workers Involved	Man-Days Lost
10 Mos.	4,500	3,200,000	52,020,000
Jan.	600	250,000	1,250,000
Feb.	550	250,000	1,270,000
Mar.	600	320,000	1,400,000
Apr.	650	1,200,000	5,300,000
May	675	1,200,000	7,500,000
June	650	1,000,000	14,000,000
July	650	850,000	12,500,000
Aug.	675	310,000	2,100,000
Sept.	700	360,000	3,200,000
Oct.	650	600,000	3,500,000
	Number of Stoppages Started	**Workers Involved**	**Man-Days Lost**
1951	4,737	2,191,500	22,910,000
1950	4,843	2,410,000	38,800,000

U. S. Department of Labor

Steel Employment, Wages, Hours and Payrolls

1952 By Months

	Number Employees (Wage and salaried workers)	Av. Hrly. Earnings (Hourly, piecework or tonnage wages)	Av. Hrs. per Week (Hourly, piecework or tonnage wages)	Total Payrolls (Wages and salaries)
Jan.	672,100	$1.958	41.4	$252,236,000
Feb.	674,000	1.942	40.9	234,864,000
Mar.	672,100	1.950	39.8	242,731,000
Apr.	669,600	1.938	37.7	225,568,000
May	662,600	1.971	36.1	223,148,000
June	a.	a.	a.	a.
July	a.	a.	a.	a.
Aug.	659,800	2.139	38.2	250,361,000
Sept.	673,600	2.206	40.3	269,391,000
Oct.	.....	....	...	....
Nov.	.....	....	...	....
Dec.	.....	....	...	....

a. — No reports issued because of steelworkers' strike.

1951 By Months

Jan.	657,200	$1.933	41.6	$245,294,000
Feb.	662,700	1.916	40.4	219,412,000
Mar.	663,100	1.920	40.4	238,318,000
Apr.	665,700	1.926	40.5	234,769,000
May	667,300	1.942	41.6	249,007,000
June	674,200	1.950	40.5	240,707,000
July	678,200	1.955	37.3	231,951,000
Aug.	679,100	1.931	40.4	246,670,000
Sept.	676,700	1.974	39.1	236,322,000
Oct.	674,000	1.931	41.4	249,856,000
Nov.	675,300	1.978	40.2	242,138,000
Dec.	675,100	1.987	39.0	246,726,000
Year 1951	670,717	$1.945	40.2	$2,881,170,000

1950 By Months

Jan.	609,400	$1.720	38.5	$189,346,000
Feb.	613,400	1.704	38.8	174,723,000
Mar.	615,600	1.697	38.8	189,964,000
Apr.	621,100	1.707	38.5	186,185,000
May	628,200	1.722	39.7	199,905,000
June	635,900	1.714	39.3	195,332,000
July	643,000	1.744	35.5	188,711,000
Aug.	648,900	1.717	39.7	206,623,000
Sept.	649,500	1.757	39.4	203,783,000
Oct.	650,400	1.726	40.7	212,187,000
Nov.	653,200	1.763	39.8	208,000,000
Dec.	657,000	1.960	38.9	235,000,000
Year 1950	635,500	$1.746	39.0	$2,389,759,000

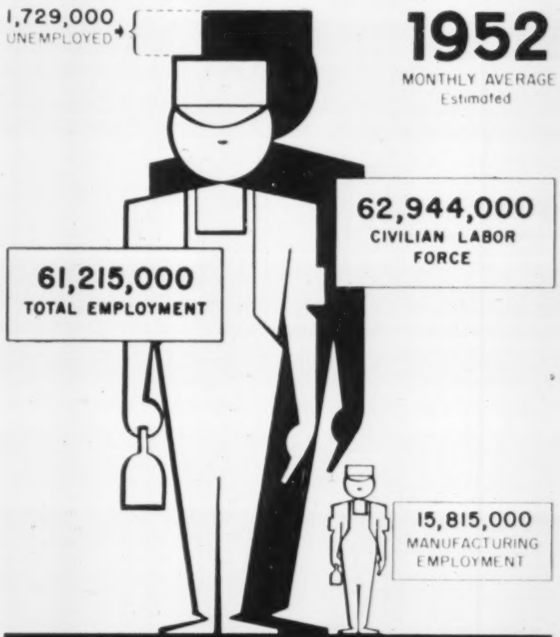
1949 By Months

Jan.	650,200	$1.712	38.9	$202,057,000
Feb.	652,800	1.696	40.1	189,751,000
Mar.	651,700	1.685	40.6	207,152,000
Apr.	646,600	1.688	38.5	191,886,000
May	637,400	1.697	37.0	188,439,000
June	624,500	1.684	37.6	181,787,000
July	609,600	1.699	31.8	160,301,000
Aug.	603,100	1.682	36.5	175,607,000
Sept.	600,200	1.712	36.8	173,450,000
Oct.-Nov.	583,800	1.782	17.7	206,590,000
Dec.	602,400	1.706	38.1	184,750,000
Year 1949	620,500	$1.703	34.5	$2,061,770,000

MONTHLY AVERAGES, AND TOTAL PAYROLLS

1951	670,717	$1.945	40.2	$2,881,170,000
1950	635,500	1.746	39.0	2,389,759,000
1949	620,500	1.703	34.5	2,061,770,000
1948	635,600	1.630	39.1	2,234,461,000
1947	616,300	1.513	38.6	1,986,600,000
1946	575,300	1.347	35.1	1,544,142,000
1945	551,200	1.248	44.2	1,645,332,700
1944	571,200	1.219	46.7	1,745,019,700
1943	625,700	1.135	43.0	1,649,227,000
1942	647,200	1.056	38.9	1,467,058,700
1941	633,000	.959	38.6	1,301,347,800
1940	546,800	.850	36.2	960,779,300
1939	482,585	.840	34.8	812,775,082
1938	442,739	.830	27.6	613,198,987
1937	572,244	.818	36.8	976,083,169

American Iron & Steel Institute



TOTAL U.S. EMPLOYMENT

(In Thousands)

1952 By Months

	Civilian Labor Force	Total Employment	Unemployment	Mfg. Employment
Jan.	61,780	59,726	2,054	15,776
Feb.	61,838	59,752	2,086	15,859
Mar.	61,518	59,714	1,804	15,869
Apr.	61,744	60,132	1,612	15,795
May	62,778	61,176	1,602	15,654
June	64,390	62,572	1,818	15,410
July	64,176	62,234	1,942	15,162
Aug.	63,958	62,354	1,604	16,015
Sept.	63,698	62,260	1,438	16,361
Oct.	63,146	61,862	1,284	16,406
Nov.	63,646	62,228	1,418	.....
Dec.	.....	.....	....	.....

1951 By Months

Jan.	61,514	59,010	2,503	15,784
Feb.	61,313	58,905	2,407	15,978
Mar.	62,325	60,179	2,147	16,022
Apr.	61,789	60,044	1,744	15,955
May	62,803	61,193	1,609	15,853
June	63,783	61,803	1,980	15,956
July	64,382	62,526	1,856	15,813
Aug.	64,208	62,630	1,578	16,008
Sept.	63,186	61,580	1,606	16,039
Oct.	63,452	61,836	1,616	15,965
Nov.	63,164	61,336	1,828	15,890
Dec.	62,688	61,014	1,674	15,913
1951 Av.	62,884	61,005	1,879	15,931

1950 By Months

Jan.	61,427	56,947	4,480	13,980
Feb.	61,637	56,953	4,684	13,997
Mar.	61,675	57,551	4,123	14,103
Apr.	62,183	58,668	3,515	14,162
May	62,788	59,731	3,057	14,413
June	64,866	61,482	3,384	14,666
July	64,427	61,214	3,213	14,777
Aug.	64,867	62,367	2,500	15,450
Sept.	63,567	61,226	2,341	15,685
Oct.	63,704	61,764	1,940	15,827
Nov.	63,512	61,271	2,240	15,765
Dec.	62,538	60,308	2,229	15,789
1950 Av.	63,099	59,957	3,142	14,884

MONTHLY AVERAGES

1949	62,105	58,710	3,395	14,146
1948	61,442	59,378	2,064	15,286
1947	60,168	58,027	2,142	15,247
1946	57,520	55,250	2,270	14,461
1945	53,860	52,820	1,040	15,302
1944	54,630	53,960	670	17,111
1943	55,540	54,470	1,070	17,381
1942	56,410	53,750	2,660	15,051
1941	55,910	50,350	5,560	12,974
1940	55,640	47,520	8,120	10,780
1939	55,230	45,750	9,480	10,078
1938	54,610	44,220	10,390	9,253
1937	54,000	46,300	7,700	10,606

U. S. Department of Labor
U. S. Department of Commerce

Labor

Labor Union Membership

Thousands of Members

Year	American Federation of Labor	Congress of Industrial Organizations	Independent or Unaffiliated Unions	Total
1952†	8,500	5,600	2,600	16,700
1951†	7,800	5,600	2,600	16,000
1950	7,143	n.a.	2,400- 2,800	14,000- 16,000
1949	7,241	n.a.	2,000- 2,300	14,000- 16,000
1948	7,221	n.a.	2,200- 2,500	14,000- 16,000
1947	7,578	6,000	1,836	15,414
1946	7,152	6,000	1,822	14,974
1945	6,931	6,000	1,865	14,796
1944	6,807	5,935	1,879	14,621
1943	6,564	5,285	1,793	13,642
1942	5,483	4,195	1,084	10,762
1941	4,569	5,000	920	10,489
1940	4,247	3,625	1,072	8,944
1939	4,006	4,000	974	8,980
1938	3,623	4,038	604	8,265
1937	2,861	3,718	639	7,218
1936	3,422	....	742	4,164
1935	3,045	....	683	3,728
1934	2,608	....	641	3,249
1933	2,127	....	730	2,857
1932	2,532	....	694	3,226
1931	2,890	....	636	3,526
1930	2,961	....	671	3,632
1929	2,934	....	691	3,625
1928	2,896	....	671	3,567
1927	2,813	....	787	3,600
1926	2,804	....	788	3,592
1925	2,877	....	689	3,566
1924	2,866	....	683	3,549
1923	2,926	....	703	3,629
1922	3,196	....	754	3,950
1921	3,907	....	815	4,722
1920	4,079	....	955	5,034
1919	3,260	....	786	4,046
1918	2,726	....	642	3,368
1917	2,371	....	605	2,976
1916	2,073	....	649	2,722
1915	1,946	....	614	2,560
1914	2,021	....	626	2,647
1913	1,996	....	665	2,661
1912	1,770	....	635	2,405
1911	1,762	....	556	2,318
1910	1,562	....	554	2,116
1909	1,483	....	482	1,965
1908	1,587	....	505	2,092
1907	1,539	....	538	2,077
1906	1,454	....	438	1,892
1905	1,494	....	424	1,918
1904	1,676	....	391	2,067
1903	1,466	....	358	1,824
1902	1,024	....	311	1,335
1901	788	....	270	1,058
1900	548	....	243	791
1899	349	....	201	550
1898	278	....	189	467

U. S. Department of Labor

† Estimated by STEEL n.a.—Not available

Labor Turn-Over

Rates Per 100 Employees in Manufacturing Industries

SEPARATIONS

	Quit		Discharge		Lay-Off		Miscellaneous		Total	
	1952	1951	1952	1951	1952	1951	1952	1951	1952	1951
Jan.	1.9	2.1	0.3	0.3	1.4	1.0	0.4	0.7	4.0	4.1
Feb.	1.9	2.1	0.3	0.3	1.3	0.8	0.4	0.6	3.9	3.8
Mar.	2.0	2.5	0.3	0.3	1.1	0.8	0.3	0.5	3.7	4.1
Apr.	2.2	2.7	0.3	0.4	1.3	1.0	0.3	0.5	4.1	4.6
May	2.2	2.8	0.3	0.4	1.1	1.2	0.3	0.4	3.9	4.8
June	2.2	2.5	0.3	0.4	1.1	1.0	0.3	0.4	3.9	4.3
July	2.2	2.4	0.3	0.3	2.2	1.3	0.3	0.4	5.0	4.4
Aug.	3.0	3.1	0.3	0.4	1.0	1.4	0.3	0.4	4.6	5.3
Sept.	3.5	3.1	0.4	0.3	0.7	1.3	0.3	0.4	4.9	5.1
Oct.		2.5		0.4		1.4		0.4		4.7
Nov.		1.9		0.3		1.7		0.4		4.3
Dec.		1.4		0.3		1.5		0.3		3.5

ACCESSIONS

	1952	1951		1952	1951		1952	1951
Jan.	4.4	5.2	May	3.9	4.5	Sept.	5.7	4.3
Feb.	3.9	4.4	June	4.9	4.9	Oct.		4.4
Mar.	3.9	4.6	July	4.4	4.2	Nov.		3.9
Apr.	3.7	4.5	Aug.	5.9	4.5	Dec.		3.0

U. S. Department of Labor

Wages and Hours in Selected Industries

(Production Workers)

Stamped and Pressed Metal Products

	EARNINGS (Hourly Avg.)		HOURS (Weekly Avg.)	
	1952	1951	1952	1951
Jan.	$1.804	$1.675	42.0	41.5
Feb.	1.810	1.689	42.0	41.3
Mar.	1.827	1.718	41.7	41.6
Apr.	1.806	1.713	40.8	41.0
May	1.818	1.706	41.2	40.4
June	1.821	1.725	40.8	41.2
July	1.784	1.739	38.1	39.5
Aug.	1.812	1.732	40.6	39.7
Sept.	...	1.755	...	40.3
Oct.	...	1.766	...	40.5
Nov.	...	1.774	...	40.5
Dec.	...	1.773	...	41.4

Metalworking Machinery

(Except Machine Tools)

	1952	1951	1952	1951
Jan.	$1.852	$1.768	45.7	43.5
Feb.	1.873	1.790	45.9	44.6
Mar.	1.880	1.796	46.1	44.7
Apr.	1.865	1.807	44.7	45.7
May	1.873	1.802	45.2	45.6
June	1.874	1.808	45.3	45.4
July	1.850	1.807	43.7	44.8
Aug.	1.882	1.804	44.5	44.9
Sept.		1.835		45.6
Oct.		1.838		46.4
Nov.		1.842		45.0
Dec.		1.860		46.1

Machine Tools

	1952	1951	1952	1951
Jan.	$1.864	$1.729	48.6	47.3
Feb.	1.874	1.740	47.7	47.5
Mar.	1.886	1.749	47.6	47.4
Apr.	1.878	1.760	46.9	47.8
May	1.886	1.769	46.9	47.7
June	1.887	1.772	46.5	47.1
July	1.870	1.745	44.9	46.9
Aug.	1.901	1.797	46.5	47.1
Sept.		1.826		46.5
Oct.		1.863		48.0
Nov.		1.837		47.3
Dec.		1.857		48.3

Fabricated Structural Metal Products

	1952	1951	1952	1951
Jan.	$1.718	$1.639	42.7	42.2
Feb.	1.723	1.653	42.8	42.0
Mar.	1.730	1.663	42.8	42.4
Apr.	1.728	1.683	41.8	42.7
May	1.731	1.676	42.4	42.7
June	1.727	1.677	41.7	42.6
July	1.721	1.677	41.6	41.7
Aug.	1.754	1.685	42.0	42.7
Sept.		1.701		43.1
Oct.		1.704		42.6
Nov.		1.712		42.6
Dec.		1.725		43.4

Agricultural Machinery and Tractors

	EARNINGS (Hourly Avg.)		HOURS (Weekly Avg.)	
	1952	1951	1952	1951
Jan.	$1.859	$1.748	40.8	41.1
Feb.	1.893	1.747	40.2	40.8
Mar.	1.901	1.782	41.0	41.0
Apr.	1.918	1.793	40.8	41.1
May	1.915	1.792	40.7	40.9
June	1.896	1.810	40.0	41.0
July	1.873	1.798	39.5	40.8
Aug.	1.870	1.824	39.0	39.7
Sept.		1.863		40.0
Oct.		1.823		40.6
Nov.		1.831		40.1
Dec.		1.858		41.2

Automobiles

	1952	1951	1952	1951
Jan.	$1.989	$1.847	40.5	38.7
Feb.	1.976	1.862	40.4	39.9
Mar.	2.001	1.889	40.4	40.3
Apr.	1.997	1.877	39.9	39.7
May	2.001	1.882	40.1	39.8
June	2.012	1.925	39.4	38.9
July	1.990	1.934	36.1	37.9
Aug.	2.022	1.932	38.1	39.5
Sept.	...	1.948	...	39.8
Oct.	...	1.948	...	39.7
Nov.	...	1.955	...	39.1
Dec.		1.978		40.4

Aircraft and Parts

	1952	1951	1952	1951
Jan.	$1.841	$1.757	43.2	43.7
Feb.	1.852	1.752	43.2	43.3
Mar.	1.878	1.762	42.9	43.9
Apr.	1.859	1.753	42.0	44.0
May	1.878	1.759	42.8	43.9
June	1.882	1.765	42.7	43.8
July	1.890	1.773	42.6	43.7
Aug.	1.903	1.777	42.1	43.6
Sept.		1.806		43.9
Oct.		1.803		43.3
Nov.		1.819		43.9
Dec.		1.827		44.1

Gray Iron Foundries

	1952	1951	1952	1951
Jan.	$1.705	$1.620	41.4	43.6
Feb.	1.706	1.637	40.3	42.7
Mar.	1.715	1.663	40.6	43.4
Apr.	1.715	1.656	40.0	42.8
May	1.720	1.657	40.0	42.7
June	1.717	1.658	39.9	42.5
July	1.671	1.650	38.5	41.3
Aug.	1.723	1.658	39.8	41.5
Sept.	...	1.665	...	41.4
Oct.		1.678		41.4
Nov.		1.682		41.0
Dec.		1.693		41.6

Trade

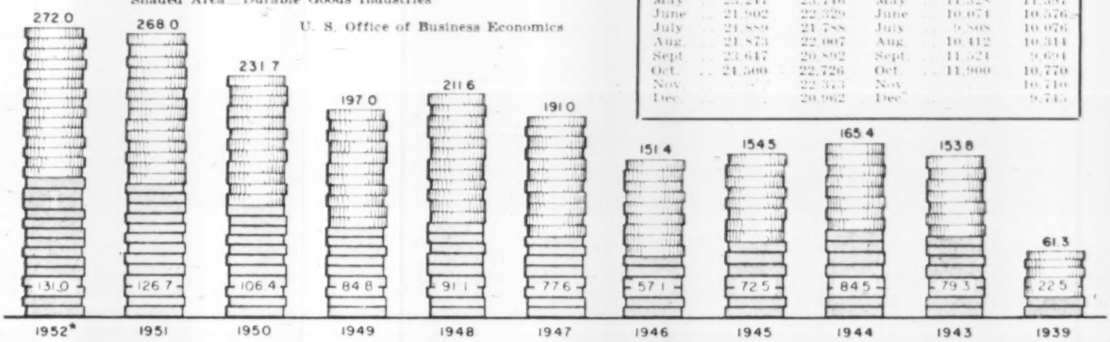
METALWORKING FACTS AND FIGURES

ANNUAL SALES TOTALS

(BILLIONS OF DOLLARS—NOT ADJUSTED FOR SEASONAL VARIATION)

Entire Bar=All Manufacturing Industries
Shaded Area=Durable Goods Industries

U. S. Office of Business Economics



1952-1951 By Months

(Millions of Dollars, Seasonally Adjusted)

	All Manufacturing Industries			Durable Goods Industries	
	1952	1951		1952	1951
Jan.	22,634	22,964	Jan.	10,861	10,721
Feb.	23,506	22,778	Feb.	11,352	10,717
Mar.	22,085	23,064	Mar.	10,632	11,166
Apr.	23,538	22,836	Apr.	11,310	10,972
May	23,247	23,746	May	11,328	11,397
June	21,902	22,329	June	10,071	10,576
July	21,889	21,788	July	9,808	10,076
Aug.	21,873	22,007	Aug.	10,412	10,314
Sept.	23,647	20,892	Sept.	11,524	9,694
Oct.	21,500	22,726	Oct.	11,900	10,770
Nov.		22,373	Nov.		10,710
Dec.		20,962	Dec.		9,745

Inventories at End of Month

Millions of Dollars, Seasonally Adjusted

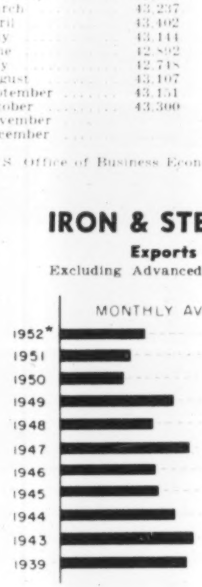
	All Manufacturing Industries		Durable Goods Industries	
	1952	1951	1952	1951
January	43,077	35,008	23,110	17,375
February	43,168	35,504	23,313	17,670
March	43,237	36,362	23,401	17,959
April	43,402	37,805	23,596	18,576
May	43,144	38,773	23,595	19,273
June	42,892	39,684	23,348	19,903
July	42,748	40,652	22,962	20,479
August	43,107	41,532	23,200	21,121
September	43,151	42,067	23,300	21,542
October	43,300	42,437	23,600	21,968
November		42,692		22,337
December		43,039		22,884

U. S. Office of Business Economics

IRON & STEEL PRODUCTS

Exports and Imports

Excluding Advanced Manufactures—Net Tons



	EXPORTS	IMPORTS
1952*	387,000	138,000
1951	316,977	326,842
1950	278,174	231,687
1949	446,247	132,786
1948	407,086	80,872
1947	585,004	17,504
1946	429,112	9,786
1945	433,604	17,661
1944	512,302	16,782
1943	599,692	14,920
1939	567,802	29,416

1952-1951 By Months

	Exports		Imports	
	1952	1951	1952	1951
January	402,297	305,897	235,432	479,284
February	406,835	267,309	182,090	403,146
March	502,778	353,346	148,562	405,191
April	483,074	299,794	129,661	387,851
May	529,360	296,954	99,315	378,358
June	339,759	280,662	92,539	292,784
July	223,832	287,245	89,559	315,358
August	302,284	305,893	111,957	279,818
September	......	349,615	......	255,268
October	......	296,081	......	248,186
November	......	344,232	......	219,559
December	......	416,700	......	257,307

U. S. Office of Business Economics

Manufacturers' New Orders

Value Millions of Dollars, Adjusted for Seasonal Variation

1952	Total Durables	Primary Metals	Fab. Metal Products	Electrical Mchy.	Mchy. Except Elec.	Transptn. Equip.	Other† Durables and Ordnance	Total Durables 1951	Total Durables 1950	Total Durables 1949
Jan.	11,115	2,013	1,175	1,195	1,966	2,421	2,346	15,269	7,321	6,164
Feb.	11,392	1,947	1,058	1,550	1,984	2,488	2,364	14,581	7,357	6,765
Mar.	11,841	1,749	984	1,955	1,708	3,330	2,116	14,526	7,717	6,407
Apr.	12,761	2,258	1,262	1,289	1,934	3,447	2,517	13,685	8,150	6,083
May	11,492	1,883	1,275	1,156	1,713	3,009	2,456	14,022	9,875	6,458
June	12,437	1,285	1,278	1,355	1,908	4,019	2,592	12,459	9,979	6,148
July	11,512	1,493	1,252	1,174	1,916	3,069	2,609	12,110	11,734	5,970
Aug.	9,646	1,497	1,142	1,066	1,515	2,308	2,118	10,681	13,683	6,467
Sept.	11,998	2,238	1,406	1,243	1,915	3,024	2,172	10,266	12,756	7,208
Oct.								12,567	12,347	6,907
Nov.								11,820	11,258	7,248
Dec.								10,937	12,913	7,477

† Includes professional and scientific instruments, lumber, furniture, stone, clay and glass and miscellaneous industries
U. S. Office of Business Economics

Foreign Trade

Value Millions of Dollars

	Exports			Imports		
	1952	1951	1950	1952	1951	1950
Jan.	1,252	974	741	922	1,023	623
Feb.	1,335	1,076	761	892	916	600
Mar.	1,421	1,285	860	963	1,100	665
Apr.	1,337	1,370	803	933	1,033	585
May	1,466	1,354	829	835	1,018	659
June	1,164	1,294	877	860	930	686
July	1,015	1,190	779	836	894	709
Aug.	1,072	1,269	762	817	881	820
Sept.	1,217	1,232	911	877	721	862
Oct.		1,152	906		834	923
Nov.		1,387	978		819	854
Dec.		1,438	1,065		801	867

Monthly Averages

	Exports	Imports
1952*	1,250	875
1951	1,252	914
1950	856	738
1949	1,003	552
1948	1,054	594
1947	1,278	480
1946	812	412
1945	817	347
1944	1,188	327
1943	1,080	282
1942	673	230
1941	429	279
1939	265	193

U. S. Bureau of the Census

Iron and Steel Scrap

(Net Tons)

	Exports		Imports	
	1952	1951	1952	1951
Jan.	21,992	9,766	15,169	66,902
Feb.	16,247	18,339	9,285	46,017
Mar.	17,074	17,829	12,115	54,489
Apr.	21,200	21,587	13,441	22,260
May	29,928	20,111	7,635	19,086
June	42,058	14,456	2,829	14,102
July	54,735	21,829	4,805	28,993
Aug.	36,708	22,213	7,601	26,074
Sept.		25,455		17,116
Oct.		20,651		17,417
Nov.		21,533		24,630
Dec.		19,115		22,013

Monthly Averages

	Exports	Imports
1952*	30,412	9,073
1951	19,407	29,925
1950	18,080	61,483
1949	24,883	91,994
1948	20,308	34,589
1947	16,185	3,016
1946	12,424	2,519
1945	7,978	3,856
1944	7,973	9,070
1943	4,575	11,555
1942	11,811	7,680
1941	75,354	5,997
1939	334,548	2,753

* Estimated

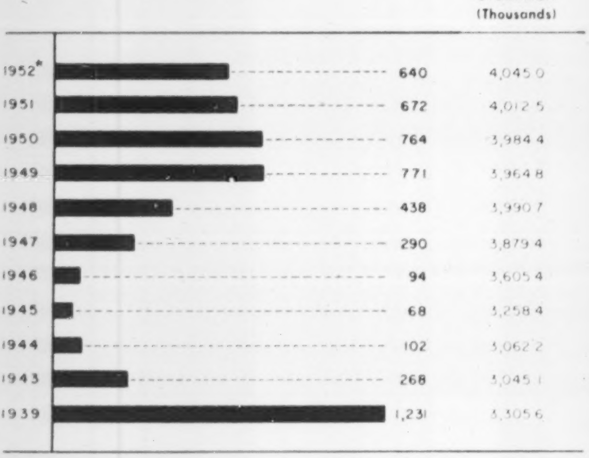
U. S. Office of Business Economics

Trade

METALWORKING FACTS AND FIGURES

BUSINESS FAILURES

Total Monthly Averages

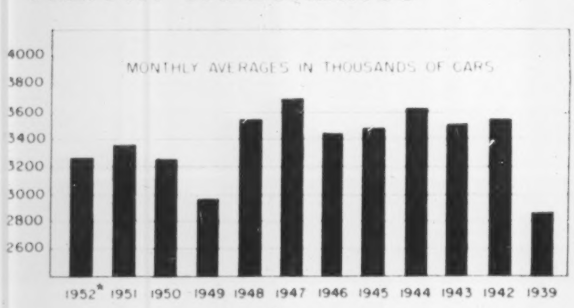


Failures—Liabilities

	FAILURES			LIABILITIES	
	Total	Construction	Mfg., Mining	Construction	Mfg., Mining
1952					
January	671	68	143	$2,672,000	$8,365,000
February	619	70	133	1,935,000	5,614,000
March	715	72	148	2,485,000	13,046,000
April	780	93	171	3,853,000	12,633,000
May	638	75	111	2,646,000	10,217,000
June	671	78	128	2,999,000	6,971,000
July	580	48	133	3,196,000	8,882,000
August	594	58	109	1,816,000	5,056,000
September	539	50	107	2,729,000	6,780,000
October	631	88	146	5,167,000	13,079,000
November	...	..	...	....	....
December	...	..	...	....	....
Monthly Averages					
1952*	640	..	...	....	....
1951	672	80	128	$3,123,000	$7,581,000
1950	764	76	173	2,138,000	7,925,000
1949	771	70	194	2,270,000	11,939,000
1948	438	37	123	1,301,000	10,858,000
1947	290	20	106	601,000	11,894,000
1946	94	12	39	362,000	3,241,000
1945	68	8	23	297,000	1,437,000
1944	102	14	29	198,000	1,681,000
1943	268	33	47	455,000	1,588,000
1939	1,231	54	243	919,000	5,929,000

Dun & Bradstreet Inc.

FREIGHT CARLOADINGS



Businesses in Operation

(In Thousands at End of Quarter)

	Total	Contract Construction	Manufacturing	Service
1952				
First Qtr.	4,035.9	390.6	305.1	863.2
Second Qtr.	.....	.....	....	....
1951 (Avg.)	4,012.5	377.3	306.1	858.3
First Qtr.	4,007.4	372.3	306.7	857.2
Second Qtr.	4,016.4	377.5	308.0	858.3
Third Qtr.	4,012.1	379.0	305.3	858.0
Fourth Qtr.	4,014.0	380.3	304.3	859.6
Annual Averages				
1950	3,984.4	361.3	303.1	854.6
1949	3,964.8	335.0	312.0	853.0
1948	3,990.7	321.0	329.6	857.4
1947	3,879.4	289.3	330.6	830.6
1946	3,605.4	242.6	301.9	772.8
1945	3,258.4	176.8	262.8	706.0
1944	3,062.2	153.4	245.2	657.1
1943	3,045.1	157.5	238.8	652.5
1942	3,302.2	177.2	237.9	699.2
1941	3,363.6	186.8	235.3	705.8
1939	3,305.6	199.7	223.0	701.8

U. S. Office of Business Economics

New Business Incorporations

	1952	1951	1950	1949	1948
January	8,357	8,515	9,070	7,906	11,000
February	7,138	6,590	7,736	6,362	7,873
March	7,902	7,649	9,180	7,637	9,346
April	8,284	7,653	8,375	7,273	9,223
May	7,915	7,544	9,216	7,445	8,246
June	7,819	6,810	8,861	7,260	8,550
July	7,549	6,428	7,191	6,424	7,690
August	7,088	6,496	7,201	6,828	6,723
September	7,529	5,950	6,277	6,867	6,930
October	8,234	6,812	6,782	6,877	6,686
November		6,289	6,256	6,755	6,413
December		6,913	6,780	7,857	7,421
Total		83,649	92,925	85,491	96,101
Monthly Avg.	7,770	6,971	7,744	7,124	8,008

Dun & Bradstreet Inc.

Discontinued Businesses

(Thousands)

	Total	Contract Construction	Manufacturing	Service
1952				
First Qtr.	100.8	13.9	12.1	17.6
Second Qtr.	...	...	...	...
1951 (Avg.)	94.4	13.3	11.0	16.7
First Qtr.	100.2	14.3	10.8	18.3
Second Qtr.	101.0	14.2	11.6	18.1
Third Qtr.	95.7	13.3	11.8	16.8
Fourth Qtr.	80.6	11.6	9.9	13.7
Annual Averages				
1950	91.3	11.4	10.5	18.1
1949	96.6	11.7	13.3	18.8
1948	92.7	10.8	11.9	19.8
1947	72.9	9.1	10.3	15.2
1946	56.6	6.7	7.3	12.8

U. S. Office of Business Economics

1952—By Weeks

Jan. 5	612,780	May 3	744,592	Sept. 6	746,044
Jan. 12	742,757	May 10	719,793	Sept. 13	881,218
Jan. 19	747,662	May 17	754,373	Sept. 20	873,559
Jan. 26	727,933	May 24	761,647	Sept. 27	862,061
Feb. 2	731,006	May 31	697,026	Oct. 4	851,866
Feb. 9	733,724	June 7	684,243	Oct. 11	842,713
Feb. 16	737,609	June 14	631,043	Oct. 18	838,377
Feb. 23	683,368	June 21	643,860	Oct. 25	760,741
Mar. 1	755,624	June 28	649,172	Nov. 1	862,012
Mar. 8	714,247	July 5	447,396	Nov. 8	829,198
Mar. 15	708,826	July 12	572,387	Nov. 15	828,723
Mar. 22	719,921	July 19	608,957	Nov. 22	810,922
Mar. 29	725,423	July 26	607,271	Nov. 29	670,167
Apr. 5	707,142	Aug. 2	732,920	Dec. 6	......
Apr. 12	690,660	Aug. 9	782,171	Dec. 13	......
Apr. 19	735,097	Aug. 16	805,704	Dec. 20	......
Apr. 26	779,402	Aug. 23	834,120	Dec. 27	......
		Aug. 30	727,344		

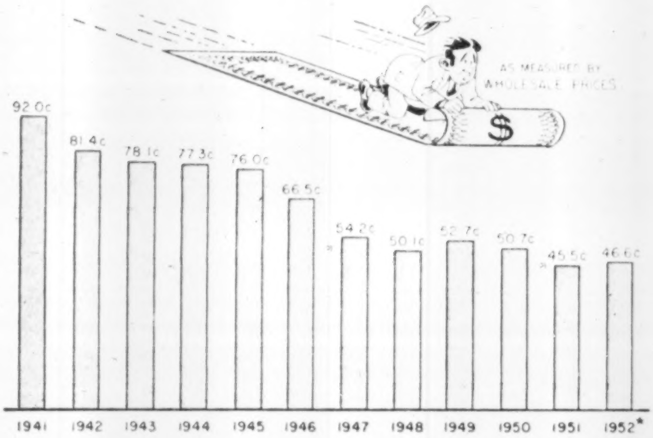
Association of American Railroads

* Estimated

METALWORKING FACTS AND FIGURES

PURCHASING POWER OF THE DOLLAR

(1935-1939=100)



AS MEASURED BY:

	Wholesale Prices	Consumers' Prices	Retail Food Prices
1952*	46.6	52.8	43.3
Jan.	46.3	52.9	43.0
Feb.	46.5	53.2	44.0
Mar.	46.5	53.2	43.9
Apr.	46.7	53.0	43.5
May	46.8	52.9	43.3
June	47.0	52.7	43.2
July	46.7	52.4	42.6
Aug.	46.6	52.3	42.5
Sept.	46.8	52.4	42.9
Oct.	...	...	...

Monthly Averages

	Wholesale Prices	Consumers' Prices	Retail Food Prices
1951	45.5	53.9	44.0
1950	50.7	58.2	48.9
1949	52.7	58.8	49.5
1948	50.1	58.2	47.6
1947	54.2	62.7	51.5
1946	66.5	71.7	62.6
1945	76.0	77.8	71.8
1944	77.3	79.6	73.4
1943	78.1	80.8	72.4
1939	104.3	100.6	104.9

U. S. Office of Business Economics

National Income

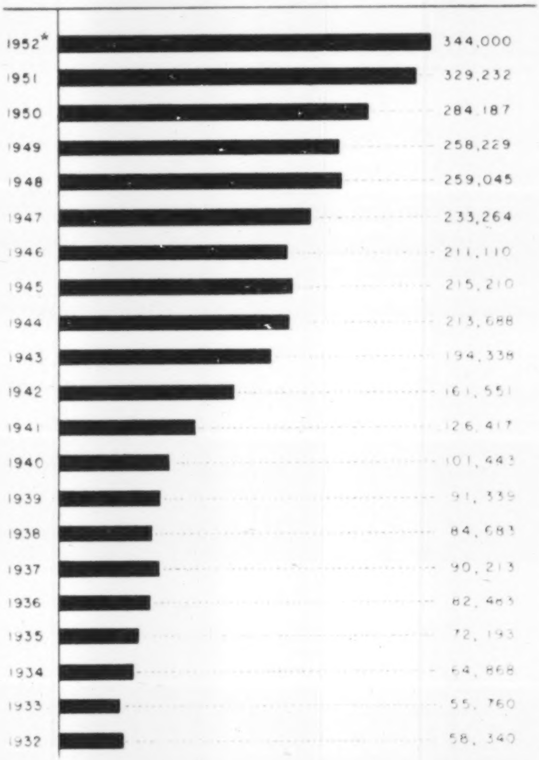
(Millions of Dollars)

1952*	297,000
1951	277,554
1950	239,170
1949	216,259
1948	223,469
1947	198,688
1946	180,286
1945	182,691
1944	183,838
1943	169,686
1942	137,119
1941	103,834
1940	81,347
1939	72,532
1938	67,375
1937	73,627
1936	64,719
1935	56,789
1934	48,613
1933	39,584
1932	41,690
1931	58,873

Dept. of Com.
* Estimated

GROSS NATIONAL PRODUCT OR EXPENDITURE

(Millions of Dollars)



* Estimated. Department of Commerce

U. S. Revenues, Expenditures, Debt

Year	Net Receipts 000,000	Per Capita Receipts	Expenditures 000,000	Per Capita Expenditures	Gross Debt 000,000	Per Capita Debt
1952	$62,129	$396.22	$66,146	$421.84	$259,105	$1652.41
1951	48,142	312.36	44,632	289.59	255,222	1655.97
1950	37,043	244.42	40,167	265.03	257,357	1698.13
1949	38,246	256.68	40,057	268.83	252,770	1696.44
1948	44,746	306.24	36,326	248.61	252,292	1726.68
1947	44,703	311.77	42,505	296.44	258,376	1801.94
1946	43,037	305.25	65,018	461.17	269,422	1910.97
1945	46,456	332.78	100,404	719.25	258,682	1853.01
1944	44,149	319.92	93,743	679.29	201,003	1455.52
1943	22,281	163.25	78,182	572.83	136,696	1001.55
1942	12,799	95.25	32,491	241.80	72,422	537.35
1941	7,607	57.29	12,774	74.16	48,961	367.54
1940	5,387	44.09	9,127	70.65	42,967	325.63
1939	5,164	43.21	8,765	70.65	40,445	308.34
1938	5,854	47.89	7,304	59.70	37,167	285.43
1937	5,028	40.93	8,281	62.69	36,427	281.82
1936	4,115	32.17	9,068	69.41	33,545	261.20
1935	3,800	29.88	7,583	58.00	28,701	225.07
1934	3,115	24.64	6,370	56.19	27,053	213.65
1933	2,079	16.54	4,325	40.91	22,538	179.21
1932	2,005	16.06	4,948	41.28	19,487	155.93
1931	3,190	25.70	4,091	32.99	16,801	135.37
1930	4,177	33.01	3,994	32.43	16,185	131.49
1929	4,033	33.19	3,848	31.67	16,931	139.40
1928	4,042	33.73	3,643	30.40	17,604	146.69
1927	4,129	34.94	3,493	29.56	18,510	156.04
1926	3,962	33.98	3,584	30.76	19,643	167.70
1925	3,780	32.91	3,529	30.73	20,516	177.82
1924	4,012	35.44	3,507	30.98	21,251	186.86
1923	4,007	35.93	3,697	33.15	22,349	200.10
1922	4,109	37.40	3,795	34.54	22,964	208.97
1921	5,625	51.98	5,538	51.18	23,976	221.09
1920	6,695	62.83	6,482	60.84	24,297	228.32
1919	5,152	49.07	18,523	176.40	25,482	240.09
1918	3,664	35.38	12,697	122.58	12,243	115.65
1917	1,124	11.00	1,978	19.36	2,975	28.57

Annual Statements of the Treasury

Corporate Income, Taxes, Dividends

(All Industries—Millions of Dollars)

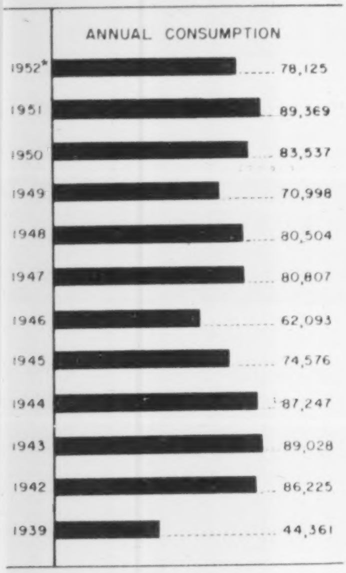
	Income Before Taxes	Taxes†	Income After Taxes	Dividend Payments	Undistributed Income
1952‡					
1st Qtr.	42,700	24,700	18,100	....	....
2nd Qtr.	39,500	22,900	16,600		
1951	42,874	24,213	18,661	9,036	9,625
1950	39,610	18,383	21,227	8,957	12,270
1949	27,107	10,817	16,290	7,469	8,821
1948	33,762	13,028	20,734	7,250	13,484
1947	30,489	11,940	18,549	6,561	11,988
1946	23,464	9,583	13,881	5,808	8,073
1945	19,717	11,215	8,502	4,699	3,803
1944	21,333	13,525	10,808	4,680	6,128

† Federal and state corporate income and excess profits tax liability.
‡ Seasonally adjusted quarterly totals at annual rates.
Department of Commerce.

METALWORKING FACTS AND FIGURES

IRON ORE

(Lake Superior)



1952-1951 By Months

Thousands of Gross Tons

Consumption at U. S. and Canadian furnaces. Stocks at U. S. and Canadian furnaces and at Lake Erie docks.

	Consumption 1952	Consumption 1951	Stocks 1952	Stocks 1951
Jan.	7,527	7,327	35,927	30,227
Feb.	7,229	6,435	29,207	24,123
Mar.	8,022	7,372	21,451	17,335
Apr.	6,616	7,235	19,592	15,072
May	6,932	7,761	25,904	19,772
June	1,403	7,499	27,170	26,423
July	1,544	7,556	27,388	33,142
Aug.	7,243	7,699	34,137	39,920
Sept.	7,659	7,473	41,532	45,451
Oct.	8,048	7,749	47,839	50,229
Nov.	.....	7,624	......	49,099
Dec.	.....	7,639	......	43,711
Total	.....	89,369	......	......

Lake Superior Iron Ore Association

Iron Ore Production

All U. S. Districts

Thousands of Gross Tons

	1952	1951	1950	1949	1948
Jan	3,704	3,812	2,777	2,920	2,757
Feb	3,665	3,315	2,492	2,882	2,686
Mar	3,714	3,525	2,496	4,335	3,019
Apr	9,073	8,796	2,999	9,889	8,687
May	13,702	14,362	10,740	11,865	11,865
June	11,633	14,932	12,355	12,923	12,578
July	2,759	15,103	13,477	12,757	12,787
Aug	14,941	15,832	14,478	11,986	12,748
Sept		14,764	13,887	10,164	11,942
Oct		13,900	12,999	709	10,003
Nov		7,652	7,401	2,049	8,577
Dec		3,682	3,362	2,816	3,675
Total		119,074	99,463	85,295	101,324

U. S. Bureau of Mines

Coke Production

Net Tons

	Oven	Beehive	Total
1952*			68,400,000
Jan	6,167,562	636,544	6,804,106
Feb	5,769,909	588,806	6,358,715
Mar	6,204,011	575,628	6,779,639
Apr	5,373,630	432,523	5,806,153
May	5,536,238	425,519	5,961,757
June	2,361,121	111,819	2,472,940
July	2,305,381	70,638	2,376,019
Aug	5,787,077	252,672	6,039,749
Sept	5,784,165	396,639	6,180,804
Oct	6,116,932	344,627	6,461,559
Nov			
Dec			

	Oven	Beehive	Total
1951	71,887,781	7,356,974	79,244,755
Jan	6,076,872	734,437	6,811,309
Feb	5,398,562	609,592	6,008,154
Mar	6,041,790	641,329	6,683,119
Apr	5,910,775	560,541	6,471,316
May	6,138,900	609,000	6,747,900
June	5,959,200	627,700	6,586,900
July	6,120,700	531,400	6,652,100
Aug	6,170,700	613,000	6,783,700
Sept	5,941,500	553,400	6,494,900
Oct	6,132,600	632,900	6,765,500
Nov	5,881,964	619,134	6,501,098
Dec	6,114,218	624,541	6,738,759

YEARLY TOTALS

	Oven	Beehive	Total
1952*			68,400,000
1951	71,887,781	7,356,974	79,244,755
1950	66,890,618	5,827,420	72,718,038
1949	60,222,481	3,414,948	63,637,429
1948	68,284,357	6,577,571	74,861,928
1947	66,758,549	6,687,301	73,445,850
1946	53,929,447	4,568,401	58,497,848
1945	62,094,288	5,213,893	67,308,181
1944	67,064,795	6,973,022	74,037,817
1943	63,742,676	7,933,387	71,676,063
1942	62,294,909	8,274,035	70,568,944
1941	58,482,422	6,704,156	65,186,578
1939	42,882,313	1,444,328	44,326,641

U. S. Bureau of Mines
* Estimated.

Iron Ore Imports

Thousands of Gross Tons

	1952	1951	1950	1949	1948
Jan	659	622	601	371	337
Feb	624	573	509	391	269
Mar	674	661	579	386	379
Apr	687	741	334	560	403
May	699	834	678	650	441
June	860	1,235	893	642	707
July	726	1,083	792	946	489
Aug	845	1,049	852	1,025	571
Sept		848	928	968	541
Oct		1,105	964	458	955
Nov		740	735	655	630
Dec		656	386	348	388
Total		10,147	8,251	7,400	6,110

U. S. Bureau of the Census

Fluorspar

Net Tons

	Production	Imports	Consumption	Stocks†
1952				
(8 mos.)	212,128	227,235	328,713	......
Jan	28,482	31,370	47,885	188,555
Feb	26,122	21,231	45,738	186,851
Mar	27,541	32,871	48,735	187,423
Apr	31,631	29,384	45,205	190,570
May	33,601	30,308	44,618	202,036
June	15,511	32,243	24,287	211,884
July	20,892	19,580	25,672	228,671
Aug	28,345	27,218	46,573	243,911

YEARLY TOTALS

	Production	Imports	Consumption	Stocks†
1951	341,300	181,275	497,012	182,409
1950	283,500	164,634	426,121	183,723
1949	236,400	95,619	315,221	167,660
1948	336,000	111,626	406,269	181,213
1947	343,700	78,379	376,138	147,251
1946	277,300	29,488	303,190	117,620

U. S. Bureau of Mines † End of period

Iron & Steel Scrap

Thousands of Net Tons

CONSUMPTION

	1952 Home	1952 Purchased	1952 Total	1951 Home	1951 Purchased	1951 Total
Jan.	3,426	3,123	6,549	3,321	3,372	6,692
Feb	3,215	3,026	6,241	2,963	3,015	5,978
Mar.	3,407	3,204	6,611	3,457	3,473	6,930
Apr	3,027	2,977	6,004	3,331	3,375	6,707
May	3,034	2,980	6,014	3,370	3,458	6,828
June	985	1,309	2,295	3,187	3,190	6,377
July	906	1,295	2,201	3,043	2,892	5,934
Aug	3,060	3,067	6,127	3,240	3,048	6,288
Sept				3,127	2,896	6,023
Oct				3,409	3,165	6,574
Nov				3,244	3,024	6,268
Dec				3,166	2,975	6,141

CONSUMERS' STOCKS†

	1952 Home	1952 Purchased	1952 Total	1951 Home	1951 Purchased	1951 Total
Jan.	1,166	3,190	4,356	1,337	4,125	5,462
Feb	1,153	3,544	4,697	1,301	3,647	4,948
Mar.	1,178	3,894	5,072	1,220	3,211	4,431
Apr	1,236	4,238	5,473	1,104	3,111	4,215
May	1,263	4,598	5,861	1,123	3,031	4,154
June	1,272	4,973	6,245	1,170	2,941	4,112
July	1,299	5,291	6,590	1,171	3,028	4,199
Aug	1,379	5,648	7,027	1,212	3,215	4,427
Sept				1,215	3,222	4,437
Oct				1,255	3,237	4,492
Nov				1,240	3,183	4,422
Dec				1,199	3,168	4,366

MONTHLY AVERAGES

Consumption		Consumers' Stocks†	
1952*	5,695	1952*	5,780
1951	6,395	1951	4,472
1950	5,740	1950	5,272
1949	4,528	1949	5,631
1948	5,414	1948	4,980
1947	5,072	1947	3,966
1946	4,124	1946	3,757
1945	4,683	1945	4,073
1944	5,112	1944	5,268
1943	5,138	1943	6,170
1942	5,022	1942	4,559
1941	4,934	1941	4,529
1939	3,027	1939	5,316

U. S. Bureau of Mines † End of month

Scrap Consumption by Industries

Thousands of Net Tons

	Makers of Steel Ingots and Castings[1] 1952	Makers of Steel Ingots and Castings[1] 1951	Makers of Steel Castings[2] 1952	Makers of Steel Castings[2] 1951	Iron Foundries and Misc. 1952	Iron Foundries and Misc. 1951	Total 1952	Total 1951
Jan.	5,139	5,068	367	391	1,042	1,234	6,549	6,692
Feb	4,917	4,468	341	368	983	1,142	6,241	5,978
Mar	5,283	5,232	347	411	981	1,337	6,611	6,979
Apr	4,599	5,090	367	395	1,038	1,221	6,004	6,706
May	4,691	5,144	354	419	969	1,269	6,014	6,828
June	1,097	4,804	313	387	885	1,185	2,295	6,377
July	1,297	4,712	250	309	654	913	2,201	5,934
Aug	4,997	4,782	319	395	811	1,112	6,127	6,288
Sept		4,679		352		992		6,023
Oct		5,029		409		1,136		6,574
Nov		4,897		363		1,008		6,268
Dec		4,916		329		896		6,141

[1] Includes only those castings made by companies producing steel ingots.
[2] Excludes companies that produce both steel castings and steel ingots.
U. S. Bureau of Mines

U. S. Electricity Production Capacity

Kilowatts

1952			
Jan.	75,972,736	July	77,958,500
Feb.	75,988,830	Aug.	78,307,864
Mar.	76,339,161	Sept.	78,757,545
Apr.	76,736,358	Oct.	....
May	77,013,039	Nov.	....
June	77,462,230	Dec.	....

CAPACITIES AT YEAREND

1951	75,544,276	1935	34,435,768
1950	68,919,040	1934	34,118,741
1949	63,100,334	1933	34,586,688
1948	56,559,838	1932	34,386,739
1947	52,322,007	1931	33,698,256
1946	50,316,621	1930	32,384,363
1945	50,110,928	1929	29,839,459
1944	49,189,072	1928	27,804,576
1943	47,950,767	1927	25,079,025
1942	45,052,950	1926	23,386,194
1941	42,405,136	1925	21,472,077
1940	39,926,881	1924	17,680,743
1939	38,862,716	1923	15,642,537
1938	37,492,095	1922	14,191,922
1937	35,620,011	1921	13,518,734
1936	35,081,569	1920	12,713,608

Edison Electric Institute

ELECTRICITY OUTPUT

By Plants Contributing to Public Supply

Millions of Kilowatt-hours

1952—By Weeks

Jan. 5	7,149	May 3	6,949	Sept. 6	7,324
Jan. 12	7,666	May 10	7,039	Sept. 13	7,654
Jan. 19	7,540	May 17	7,110	Sept. 20	7,725
Jan. 26	7,616	May 24	7,146	Sept. 27	7,625
Feb. 2	7,572	May 31	6,811	Oct. 4	7,665
Feb. 9	7,456	June 7	7,005	Oct. 11	7,698
Feb. 16	7,440	June 14	7,126	Oct. 18	7,681
Feb. 23	7,461	June 21	7,254	Oct. 25	7,696
Mar. 1	7,416	June 28	7,318	Nov. 1	7,753
Mar. 8	7,497	July 5	6,478	Nov. 8	7,807
Mar. 15	7,414	July 12	6,988	Nov. 15	7,884
Mar. 22	7,354	July 19	7,180	Nov. 22	7,971
Mar. 29	7,263	July 26	7,328	Nov. 29	7,701
Apr. 5	7,219	Aug. 2	7,405	Dec. 6	8,165
Apr. 12	7,154	Aug. 9	7,495	Dec. 13	....
Apr. 19	7,104	Aug. 16	7,627	Dec. 20	....
Apr. 26	7,135	Aug. 23	7,718	Dec. 27	....
		Aug. 30	7,646		

Edison Electric Institute and Federal Power Commission

YEARLY TOTALS

Millions of Kilowatt-hours

1952*	396,150
1951	370,234
1950	329,141
1949	291,100
1948	282,698
1947	255,739
1946	223,178
1945	222,486
1944	228,189
1943	217,759
1942	185,979
1941	164,788
1939	127,642

* Estimated

Fuel Oil Consumption in Steel Industry

Thousands of Gallons

	Melting Furnaces	Heating, Annealing, etc.	Total
1951	1,781,660	742,050	2,523,710
1950	1,618,723	675,481	2,294,204
1949	1,272,367	562,930	1,835,297
1948	1,533,129	662,410	2,195,539
1947	1,511,945	655,883	2,167,828
1946	1,225,904	557,276	1,783,180
1945	1,402,527	606,130	2,008,657

American Iron & Steel Institute

Industrial Coal Stocks

(Bituminous)

Thousands of Net Tons at End of Month

	1952	1951		1952	1951
Jan.	73,792	71,766	July	77,698	72,218
Feb.	74,967	68,754	Aug.	79,567	73,492
Mar.	76,042	69,813	Sept.	81,492	74,352
Apr.	76,810	70,550	Oct.		76,080
May	78,633	73,109	Nov.		75,948
June	79,108	75,258	Dec.		74,886

U. S. Bureau of Mines

Natural Gas Consumption in Steel Industry

Millions of Cubic Feet

	Melting Furnaces	Heating, Annealing	All Other	Total
1951	44,669	126,380	35,748	206,797
1950*	44,398	128,205	31,249	203,852
1949*	36,542	96,319	30,180	163,041
1948*	39,503	99,666	28,078	167,247
1947*	34,708	90,220	24,008	148,936
1946*	30,313	86,913	27,153	144,379
1945*	32,613	94,547	20,926	148,086
1944*	33,284	90,902	20,466	144,652
1943*	37,704	99,311	18,273	155,288

* Revised

American Iron & Steel Institute

Bituminous Coal Consumption

Thousands of Net Tons

	Industrial Consumption 1952	Industrial Consumption 1951	Retail Deliveries 1952	Retail Deliveries 1951	Total 1952	Total 1951
Jan.	34,895	36,095	9,389	10,281	44,284	46,376
Feb.	31,757	32,891	7,830	9,521	39,587	42,412
Mar.	32,170	35,162	7,070	7,623	39,240	42,785
Apr.	28,422	31,912	4,214	5,043	32,636	36,955
May	27,741	31,286	3,017	3,306	30,758	34,592
June	20,235	30,150	2,978	3,719	23,213	33,869
July	20,270	29,602	3,219	3,612	23,489	33,214
Aug.	27,429	31,521	5,212	5,135	32,641	36,656
Sept.	28,335	30,190	6,176	5,564	34,511	35,754
Oct.		33,244		6,758		40,002
Nov.		34,027	....	7,408		41,435
Dec.		34,660		8,143		42,803

Monthly Averages

	Industrial Consumption	Retail Deliveries	Total
1951	32,562	6,343	38,905
1950	30,502	7,217	37,719
1949	29,530	7,525	37,055
1948	35,759	7,479	43,238
1947	37,087	8,264	45,351
1946	33,202	8,382	41,584
1945	36,331	10,150	46,482
1939	25,254	5,964	31,218

U. S. Bureau of Mines

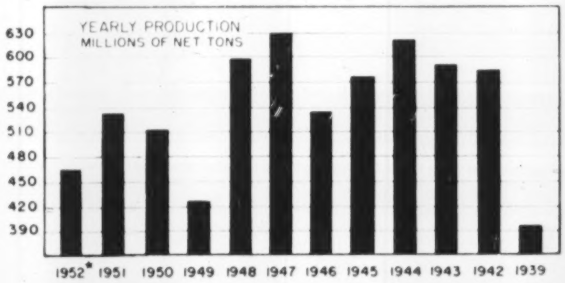
Natural Gas Sales

Millions of Therms

1952	Residential	Industrial, Commercial	Other	Total
1st Qtr	6,409	8,037	415	14,861
2nd Qtr	3,212	7,529	372	11,113
3rd Qtr				....
4th Qtr				....
1951	13,951	28,726	1,695	44,372
1st Qtr	5,924	7,112	297	13,333
2nd Qtr	3,009	7,125	350	10,484
3rd Qtr	1,265	7,027	544	8,836
4th Qtr	3,753	7,462	504	11,719

American Gas Association

BITUMINOUS COAL OUTPUT



1952—By Weeks

Thousands of Net Tons

Jan. 5	9,195	May 3	8,575	Sept. 6	9,125
Jan. 12	11,760	May 10	8,025	Sept. 13	11,850
Jan. 19	11,330	May 17	8,390	Sept. 20	11,580
Jan. 26	11,220	May 24	8,950	Sept. 27	10,030
Feb. 2	10,400	May 31	8,395	Oct. 4	9,075
Feb. 9	10,585	June 7	7,585	Oct. 11	9,050
Feb. 16	10,595	June 14	7,245	Oct. 18	8,320
Feb. 23	10,215	June 21	7,880	Oct. 25	2,150
Mar. 1	10,290	June 28	8,385	Nov. 1	9,220
Mar. 8	9,915	July 5	1,120	Nov. 8	9,900
Mar. 15	9,765	July 12	5,190	Nov. 15	10,455
Mar. 22	9,555	July 19	6,625	Nov. 22	10,425
Mar. 29	9,865	July 26	6,700	Nov. 29	9,000
Apr. 5	8,145	Aug. 2	8,350	Dec. 6	....
Apr. 12	8,050	Aug. 9	9,540	Dec. 13	....
Apr. 19	9,175	Aug. 16	9,900	Dec. 20	....
Apr. 26	9,750	Aug. 23	11,085	Dec. 27	....
		Aug. 30	2,230		

U. S. Bureau of Mines

* Estimated

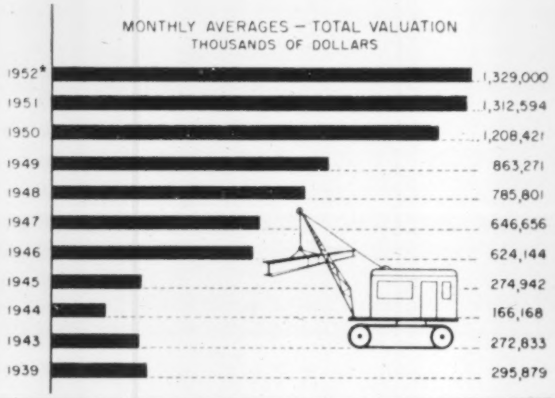
Construction

CONSTRUCTION VALUATION

37 States—Thousands of Dollars

	Total 1952	Total 1951	Public Works, Utilities 1952	Public Works, Utilities 1951	Residential and Non-residential 1952	Residential and Non-residential 1951
Jan.	902,091	1,043,248	206,694	161,314	695,397	881,934
Feb.	885,206	1,140,527	187,364	178,215	697,842	962,312
Mar.	1,321,254	1,267,450	265,261	223,627	1,055,993	1,043,823
Apr.	1,597,517	1,374,991	353,647	266,122	1,243,870	1,108,869
May	1,563,660	2,572,961	347,042	277,959	1,216,618	2,295,002
June	1,488,850	1,408,932	355,558	310,500	1,133,292	1,098,432
July	1,511,285	1,379,830	340,521	295,153	1,170,764	1,084,677
Aug.	1,438,725	1,262,811	291,189	219,288	1,147,536	1,043,523
Sept.	2,039,203	1,082,855	248,365	198,677	1,790,838	884,178
Oct.	1,310,958	1,051,419	238,125	136,969	1,072,833	914,450
Nov.	......	931,768	......	160,178	......	771,590
Dec.	......	1,234,339	......	295,228	......	939,111
Total		15,751,131		2,723,230		13,027,901

F. W. Dodge Corp.

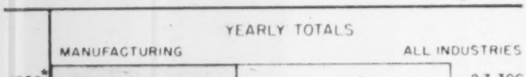


NEW PLANT AND EQUIPMENT EXPENDITURES

Millions of Dollars

	Manufacturing 1952	Manufacturing 1951	All Industries 1952	All Industries 1951
1st Quarter	2,742	2,154	6,228	5,535
2nd Quarter	3,302	2,802	6,951	6,665
3rd Quarter	3,381	2,841	7,125	6,715
4th Quarter	3,300*	3,335	7,000*	7,421
Total	12,725*	11,132	27,304*	26,336

* Estimated



U. S. Office of Business Economics, and Securities & Exchange Commission

NEW HOUSES STARTED

(Permanent Nonfarm Dwellings—Cost Estimated in Thousands of Dollars)

	Number 1952	Number 1951	Cost 1952	Cost 1951
January	64,900	85,900	$566,625	$755,600
February	77,700	80,600	682,895	716,629
March	103,900	93,800	917,867	821,745
April	106,200	96,200	948,850	866,298
May	109,600	101,000	982,232	922,661
June	103,500	132,500	964,633	1,175,497
July	102,600	90,500	951,877	827,173
August	99,000	89,100	908,346	804,317
September	98,000	96,400	......	895,543
October	101,000	90,000	......	806,955
November	......	74,500	......	672,078
December	......	60,800	......	536,042
Total	1,141,500*	1,091,300	......	$9,800,538

YEARLY TOTALS

	Number	Cost		Number	Cost
1952*	1,144,500	$......	1947	849,000	$5,642,798
1951	1,091,300	9,800,538	1946	670,500	3,769,767
1950	1,396,000	11,788,595	1944	141,800	495,054
1949	1,025,100	7,702,971	1941	706,100	2,825,895
1948	931,600	7,203,119	1933	93,000	285,446

U. S. Bureau of Labor Statistics

FABRICATED STRUCTURAL STEEL

Tons

	Orders Placed 1952	Orders Placed 1951	Orders Placed 1950	Shipments 1952	Shipments 1951	Shipments 1950
January	213,110	361,373	147,275	244,947	214,000	154,733
February	230,832	256,746	146,695	246,398	193,638	149,824
March	226,394	297,517	236,111	268,840	237,087	185,222
April	209,106	337,026	191,183	230,670	234,095	187,801
May	209,888	268,166	237,476	241,222	234,486	194,752
June	167,492	207,966	333,000	125,486	257,066	202,379
July	221,559	222,540	341,952	138,267	204,380	165,515
August	252,849	212,730	326,586	226,277	236,915	218,435
September	207,695	188,187	317,225	227,595	228,296	198,719
October	184,711	183,921	295,391	258,535	240,056	211,814
November	......	192,065	308,193	......	219,564	193,751
December	......	202,835	284,492	......	202,679	212,940
Total	......	2,931,072	3,165,579	......	2,702,262	2,275,885

	Orders Placed	Shipments
1949	1,784,981	2,159,343
1948	2,432,892	2,326,574

American Institute of Steel Construction

Industrial Building Cost Index

(1914=100)

	1952	1951	1950	1949	1948	1947
First Quarter	374	357	305	319	310	304
Second Quarter	383	373	311	313	325	300
Third Quarter	383	374	330	307	327	304
Fourth Quarter	...	374	339	307	323	307

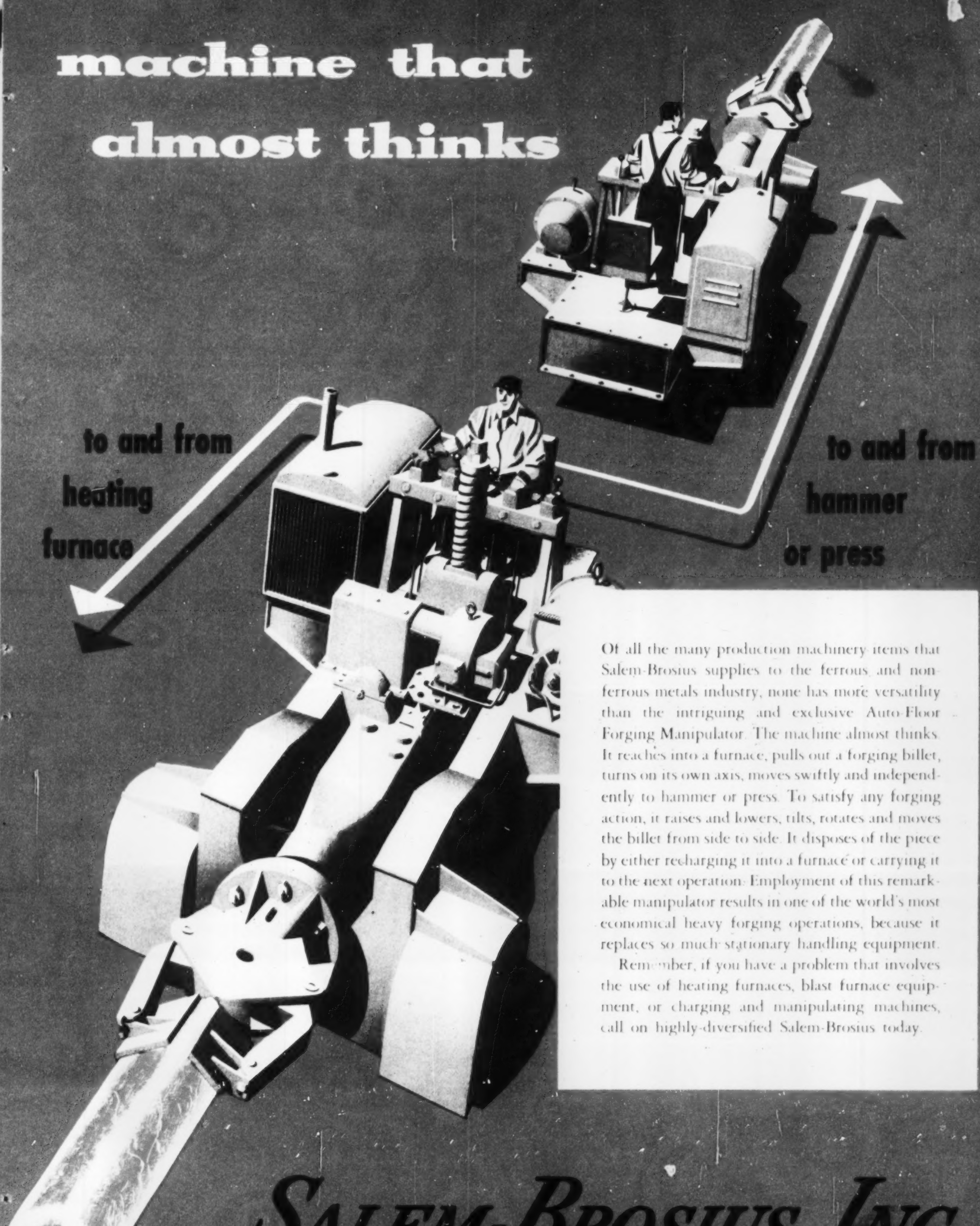
MONTHLY AVERAGES

1952*	381	1949	312	1946	279	1943	225	1940	193
1951	370	1948	321	1945	236	1942	223	1939	190
1950	321	1947	304	1944	227	1941	208	1938	191

Aberthaw Co.

*Estimated

machine that almost thinks


to and from heating furnace
to and from hammer or press

Of all the many production machinery items that Salem-Brosius supplies to the ferrous and non-ferrous metals industry, none has more versatility than the intriguing and exclusive Auto-Floor Forging Manipulator. The machine almost thinks. It reaches into a furnace, pulls out a forging billet, turns on its own axis, moves swiftly and independently to hammer or press. To satisfy any forging action, it raises and lowers, tilts, rotates and moves the billet from side to side. It disposes of the piece by either recharging it into a furnace or carrying it to the next operation. Employment of this remarkable manipulator results in one of the world's most economical heavy forging operations, because it replaces so much stationary handling equipment.

Remember, if you have a problem that involves the use of heating furnaces, blast furnace equipment, or charging and manipulating machines, call on highly-diversified Salem-Brosius today.

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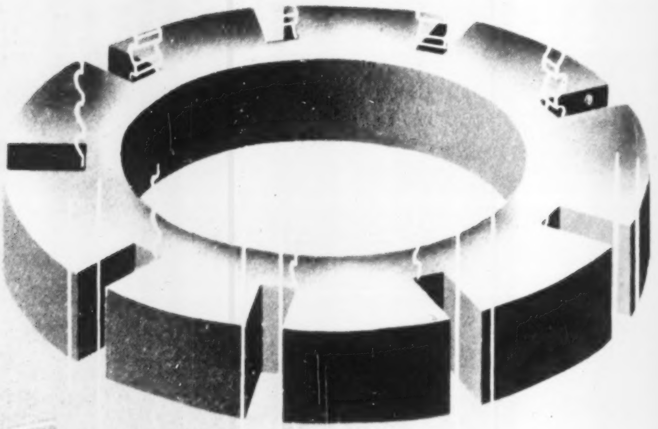
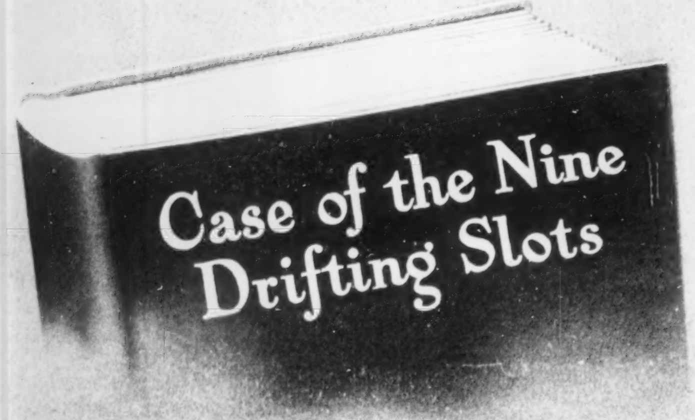
SALES AND EXECUTIVE OFFICES: 248 FOURTH AVENUE, PITTSBURGH 22, PA.
BROSIUS DIVISION, PITTSBURGH 15, PA. SALEM ENGINEERING DIVISION, SALEM, OHIO





Case of the Nine Drifting Slots

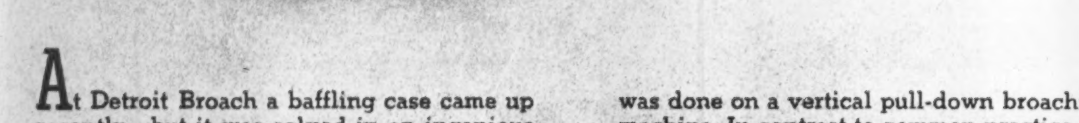
At Detroit Broach a baffling case came up recently—but it was solved in an ingenious manner.

A manufacturer found he was having considerable trouble holding close spacing tolerances on nine precision slots in the O.D. of a ring. When one slot at a time was made, the slot closed in afterward, leaving the slot undersized. This close-in made it difficult to hold spacing tolerances between the nine slots.

Detroit Broach was called in on the case, and after study, recommended that all nine slots of the nut be broached at one time. This was done on a vertical pull-down broaching machine. In contrast to common practice the work travels and the broaches are stationary in a special holder. In this manner the work is pulled through the broach holder and all nine slots are produced in one pass. Guides are incorporated in the set-up to prevent the work from drifting during the cutting operation.

This is just typical of the solutions made every day at Detroit Broach. If you have a special broaching problem, or if you would like further information on the cost saving advantages of broaching, it will pay you to contact Detroit Broach.

WORLD'S LARGEST MANUFACTURER OF BROACHES AND BROACHING TOOLS EXCLUSIVELY



DETROIT BROACH COMPANY

20201 SHERWOOD AVE. • DETROIT 34, MICH.

STEEL's
1953 FORUM ON TECHNICAL PROGRESS

On the following 35 pages STEEL presents the 210 participants in its 1953 Forum on Technical Progress in Metalworking. These 210 outstanding men, specialists in their respective fields, report tersely on significant current and anticipated technical developments. The Forum is in effect a checklist of top flight thinking in metalworking that will help you in management in your continuing planning and efforts to produce better products at lower costs for all America. For additional details on the subjects in which you are interested turn to the 14 articles based on material contributed by Forum participants and listed at the right.

STEELMAKING
NONFERROUS METALS
CASTING
MATERIALS AND METALLURGY
HEAT TREATING
INSPECTION AND TESTING
DRIVES AND CONTROLS
MACHINING AND TOOLING
FORMING
CLEANING AND FINISHING
JOINING AND ASSEMBLING
HANDLING AND PACKAGING
LUBRICATION
SERVICING AND MAINTENANCE

"... Salt bath heat treating has advanced into new fields most noteworthy of which are steel mill installations for heating alloy and stainless steel billets for extrusion of tubing and shapes ..."

WILLIAM ADAM JR.
Vice President, Ajax Electric Co. Inc., Philadelphia

"... Coke production costs emphasize the importance of intensive study to reduce heat consumption by gangue disposal reactions in the blast furnace ..."

CHARLES E. AGNEW
Consultant, Cleveland

"... Sodium hydride descaling process has been adopted for use with articles ranging in size from massive stainless steel and nonferrous plates to small Alnico magnets. Largest installation holds 170-ton bath ..."

H. L. ALEXANDER
Electrochemicals Dept., E. I. du Pont de Nemours & Co. Inc., Wilmington, Del.

"... More developments are seen in trend toward alternating current in the operation of cranes or overhead track systems ..."

A. F. ANJESKEY
Sales Manager, Cleveland Tramrail Division,
Cleveland Crane & Engineering Co., Wickliffe, O.

"... Flame washing for removing excess and defective material from ferrous castings enables cleaning floor personnel to overcome bottlenecks resulting from extensive sand inclusions or penetrations..."

R. S. BABCOCK
Linde Air Products Co., Union Carbide & Carbon Corp., New York

"... Most pleasing development comes from the reports of the copper producers that increased supplies are expected ..."

ROBERT S. BAKER
Director of Mill Operations, American Brass Co., Waterbury, Conn.

"... Compact low-cost gearing is finding broad applications in every kind of machinery, both in the form of speed reducers and in standard gear sets built into equipment..."

O. L. BARD
President, Michigan Tool Co., Detroit

"... The excellent refractory properties of gun-emplaced chrome-magnesite have attracted support from operators once skeptical of the merits of this maintenance practice ..."

HARVEY N. BARRETT JR.
Manager of Sales, Basic Refractories Inc., Cleveland

"... The press industry today is influenced considerably by the trend toward standardization. The end result will be beneficial to both press makers and users ..."

GEORGE E. BASS
President, Ferracute Machine Co., Bridgeton, N. J.

"... More shops are using larger volumes of a fewer number of cutting fluids and lubricants and are getting better results and lower costs as a consequence ..."

E. L. H. BASTIAN
Senior Engineer, Shell Oil Co., New York

"... We look to a greater utilization of new techniques and the development of new carbides to keep pace with machine tools of the future ..."

KENNETH R. BEARDSLEE
General Manager, Carboloy Department, General Electric Co., Detroit

---

"... Trend seems to be toward a single, completely enclosed, self-cooled motor for general applications as well as those requiring special enclosures ..."

F. R. BENEDICT
Assistant Engineering Manager, Industrial Products Div.,
Westinghouse Electric Corp., Pittsburgh

"... Need for acceptable methods of applying chromium directly over copper, in many cases without buffing, has accelerated significant improvements in deposition rate, brightness, and smoothness in cyanide copper plating..."

H. L. BENNER
Electrochemicals Dept., E. I. du Pont de Nemours & Co. Inc., Wilmington, Del.

"... What counts in national defense is not the weapons we build today but our capacity to build them at any time in the future..."

TELL BERNA
General Manager, National Machine Tool Builders' Association, Cleveland

"... To make full and most profitable use of the inert-gas shielded arc welding processes, jigs and fixtures employing closer tolerances, more automatic operations are needed..."

J. H. BERRYMAN
Manager, Process Development, Air Reduction Sales Co., New York

"... Development of this CO-resistant mortar which actually contributes to the immunity of brick to disintegration may be the answer to stack problems..."

RAYMOND E. BIRCH
Director of Research, Harbison-Walker Refractories Co., Pittsburgh

"... Applications for volatile corrosion inhibitor in packaging will multiply. A big field for increased use: In process and between process protection for ferrous parts..."

A. R. BLACK
Products Application Department, Shell Oil Co., New York

"... Continuous casting of steel is now a reality. Machines directed to this operation are being responsibly offered to the steel industry..."

JOHN F. BLACK
Freyn Department, Koppers Co., Pittsburgh

Technical Progress

"... Europe is breathing down our necks. If we are to hold our present leadership American producers must redouble their efforts to keep design constantly ahead of European counterparts ..."

FREDERICK S. BLACKALL JR.
President & Treasurer, Taft-Peirce Mfg. Co., Woonsocket, R. I.

"... Experience indicates faster operating speeds for overhead traveling cranes. One reason: Great strides made in alternating current control field ..."

F. M. BLUM
Sales Manager, Overhead Traveling Crane Division,
Harnischfeger Corp., Milwaukee

"... Military requirements have led to marked advances in the field of forging. The focus has been placed squarely on the light metals, heat-resisting alloys and alloys of titanium ..."

HOWARD E. BOYER
Chief Metallurgist, American Bosch Corp., Springfield, Mass.

"... Rare earths, such as cerium, praseodynium, neodynium, and samarium, grouped together, are being tried as an addition agent to confer special physical properties to cast steels ..."

HENRY C. BOYNTON
Consulting Metallurgist, Temple University, Philadelphia

"... High level output in steel foundries places emphasis on equipment and methods to produce still more. Most foundries improved and speeded mold handling by installing recent model molding machines ..."

CHARLES W. BRIGGS
Technical & Research Director, Steel Founders' Society, Cleveland

"... Heat resistant porcelain enamel coatings are being used on heat exchangers and exhaust systems for aircraft and also on domestic heating units, exhaust pipes and mufflers for trucks, as well as larger size motor silencers ..."

E. E. BRYANT
Technical Director, Frit Division, Ferro Corp., Cleveland

"... Key to the strapping industry's future is powered equipment, operating automatically and designed for integration into standard package conveyor lines ..."

J. G. BUCUSS
President, Acme Steel Products Division, Acme Steel Co., Chicago

"... Basic research and development work in gray iron casting industry during 1952 topped any other similar period in history. Understanding of basic-lined cupolas advanced considerably ..."

C. O. BURGESS
Technical Director, Gray Iron Founders' Society, Cleveland

"... We have developed a powerful x-ray source for radiographic examination of heavy weldments, castings and forgings, which will record minute details such as cracks, microshrinkage and porosity ..."

E. ALFRED BURRILL
High Voltage Engineering Corp., Cambridge, Mass.

"... A significant advance in metal cleaning is a new type of solution combining a buffered dry alkali and a solvent-wetting-agent, both soluble in water and usable in power washers at room temperature ..."

A. E. CARPENTER
Chairman of the Board, E. F. Houghton & Co., Philadelphia

"... On a year-to-year basis, a planned bottom replacement program for open hearths will produce more steel than the practice of 'riding the horse until it drops' ..."

FRANK M. CASHIN
General Sales Manager, Kaiser Aluminum & Chemical Sales Inc., Oakland, Calif.

"... In nonferrous melting, foundries are continuing the swing to induction melting and quite a few are using nose tilting furnaces for the larger sized melts ..."

FRANK T. CHESNUT
Treasurer, Ajax Electrothermic Corp., Trenton, N. J.

"... Interest continues in use of heat treated low-alloy steels as possible substitutes for the more highly alloyed ones in short life high temperature applications involving highly stressed conditions ..."

C. L. CLARK
Metallurgical Engineer, Timken Roller Bearing Co., Canton, O.

"... Impacting, although in its infancy, promises to integrate forging with other manufacturing processes—a significant advance toward the realization of the automatic factory ..."

EUGENE C. CLARKE JR.
Chambersburg Engineering Co., Chambersburg, Pa.

"... Development of satisfactory synthetic filter fabrics for high temperature and corrosive dust and fume collection makes these arrestors applicable over a wide range of difficult gas cleaning jobs ..."

C. R. CLINE
Engineering Assistant to President,
American Wheelabrator & Equipment Corp., Mishawaka, Ind.

"... In testing of metals considerable improvement has taken place in spectrographic equipment so that now one may analyze alloys and obtain the results on a piece of paper ..."

W. B. COLEMAN
W. B. Coleman & Co., Philadelphia

"... America's greatest need in the field of manufacturing is for engineers trained to carry out research and apply results to production establishing scientific bases for manufacturing processes ..."

L. V. COLWELL
Professor, College of Engineering, University of Michigan, Ann Arbor, Mich.

"... Development and acceptance of the Joint Industry Conference code has led to machines which are safer to operate and easier to service ..."

KIRKE W. CONNOR
President, Micromatic Hone Corp., Detroit

Forum on

"... Industry is facing a critical manpower shortage. To alleviate the shortage industry must support the training of more engineers and develop methods that raise unskilled worker productivity..."

H. E. CONRAD
Executive Secretary, American Society of Tool Engineers, Detroit

"... Impressive developments are around us in every quarter of the metalworking industry, but none seems to hold more promise than the process of cold extruding steel..."

J. C. COTNER
President, Hydraulic Press Mfg. Co., Mt. Gilead, O.

"... AISI-8260 has been entirely substituted for AISI-4620 material in roller bearings with sizeable savings of nickel and molybdenum..."

T. L. COUNIHAN
Chief Metallurgist, Hyatt Bearings Division, General Motors Corp., Harrison, N. J.

"... Side panels on diesel locomotives are now made by sandwiching corrugated steel core between two light gage steel sheets, the lamination being made by joining the sheet steel with an adhesive..."

G. W. CRAIN
Minnesota Mining & Mfg. Co., Detroit

"... Surveys reveal that too much time and work are involved in installation and maintenance of motor controls. Limited electrical and mechanical life is also a problem..."

G. S. CRANE
President, Cutler-Hammer Inc., Milwaukee

"... Improvement in tool lubrication and heat transfer away from the cutting edge of the tool by the Hi-Jet system shows tremendous increases in both tool life and cutting speeds..."

JOHN P. CRITCHLOW
Chief Fuels & Lubricants Engineer, Rolling Mill Section, Gulf Oil Corp., Pittsburgh

"...At slower speeds, carbide broaches proved inefficient on broaching everything but cast iron. With speeds of 150 feet and more we find a place for carbide broaches in machining steel..."

J. P. CROSBY
Vice President and Sales Manager, Lapointe Machine Tool Co., Hudson, Mass.

"...Increasing the productivity of the indirect labor that services machine tools now offers the most fertile field for savings..."

RALPH E. CROSS
Executive Vice President, Cross Co., Detroit

"...Our welding gun which uses an automatically fed consumable electrode protected by an inert-gas shield is being used in steel mill maintenance to build-up the surface of parts subject to excess wear..."

J. W. CUNNINGHAM
Process Engineer, Air Reduction Sales Co., New York

"...A method of welding with two arcs in a single crater has doubled the speed of welding normally achieved with single arc automatic welding..."

A. F. DAVIS
Vice President, Lincoln Electric Co., Cleveland

"...Iron ore producers face the crisis in their usual direct manner. They're learning to use the taconites, confident that they can take care of their customers..."

E. W. DAVIS
Mines Experiment Station, University of Minnesota, Minneapolis

"...Advances will be made in greater handling flexibility through industrial truck attachments. Elimination of pallets for handling will be stressed..."

G. B. DAVIS
Vice President, Charge of Sales, Baker-Raulang Co., Cleveland

"... Product designers can go ahead with full confidence that zinc will be available when it is needed. Available ore reserves are being extended ..."

R. DAVISON
Manager, Market Development Division, New Jersey Zinc Co., New York

"... Most important step in the advance of gas carburizing is the development of a generator capable of producing a gas of controlled composition ..."

E. G. DE CORIOLIS
Director of Research, Surface Combustion Corp., Toledo, O.

"... Addition of powder to torch cutting operations has greatly broadened the scope of this tool; powder can be metallic, such as iron, which adds heat to the flame, or a nonmetallic flux powder ..."

R. L. DEILY
Steel Mill Representative, Air Reduction Sales Co., New York

"... While it is not possible to anticipate every future development, I have full confidence that antifriction bearings will continue to match the pace set by the steel industry ..."

RICHARD H. DE MOTT
President, SKF Industries Inc., Philadelphia

"... Recent developments in compound and progressive die work adapted to hydraulically powered presses show phenomenal savings in the life of expensive dies ..."

W. C. DENISON
President, Denison Engineering Co., Columbus, O.

"... Electrical controls are the main avenue of future developments in machine tools. There is danger of excesses, however. A machine can be so complex that it's impractical commercially ..."

C. B. DE VLIEG
President, DeVlieg Machine Co., Detroit

Technical Progress

"... Most likely technical development of the Betatron in the immediate future is an increase of x-ray output and coverage by improvement of electron guiding and focussing ..."

T. W. DIETZE

General Engineering Laboratory, General Electric Co., Schenectady, N. Y.

"... Inspection work with process control to eliminate defective material as early as possible in manufacture and to correct the processes that cause defects ..."

F. B. DOANE

President, Magnaflux Corp., Chicago

"... In the development stage are several new copper alloys of low beryllium content which offer almost the same strength as the standard alloys but with increased formability and at lower cost ..."

M. J. DONACHIE

President, Beryllium Corp., Reading, Pa.

"... Strip scouring will accomplish a prefinish surface at an increased production rate as compared to grinding. Equipment investment is lower and cost of abrasives consumed is less ..."

J. C. DUKE

Vice President in Charge of Coated Abrasives Div.,
Minnesota Mining & Mfg. Co., St. Paul, Minn.

"... Abrasive-impregnated clad-type sheet provides an answer when nonslip characteristics are required for special flooring jobs ..."

E. W. EARHART

Metallurgical Engineer, Alan Wood Steel Co., Conshohocken, Pa.

"... We have been melting better than 10 tons of titanium ingots per week and have successfully produced the first wide, thin titanium strip ..."

WALTER L. FINLAY

Research Manager, Rem-Cru Titanium Inc., Midland, Pa.

"... Molybdenum high speed steels will attain even wider usage and become the new standard of the high speed steel family ..."

STEWART G. FLETCHER
Chief Metallurgist, Latrobe Steel Co., Latrobe, Pa.

"... Demand for small-quantity orders at exact specifications will bring steel warehouses to more manufacturing areas. Warehouses must have good converting and processing facilities, plus ample handling equipment ..."

D. A. FRIEDMAN
Vice President, Hanover Division, Solar Steel Corp., Union, N. J.

"... Forging equipment is getting bigger, smaller, faster and more automatic. The human element gets smaller with automatic handling, controls, lubrication and safety-shut-offs ..."

R. G. FRIEDMAN
Vice President, National Machinery Co., Tiffin, O.

"... Benefits of industrial safety—particularly visual safety—can be measured in direct bonuses to management and to workers. A corrective program adapts vision to the occupation ..."

C. H. GALLAWAY
General Manager, Safety Products Division, American Optical Co., Southbridge, Mass.

"... The major cycle of machinery replacement must come both for reducing costs of civilian product and strengthening the National Defense industrial base ..."

FREDERICK V. GEIER
President, Cincinnati Milling Machine Co., Cincinnati

"... Zinc die castings should show continual expansion of market now that end-use limitations and other government controls no longer discourage industrial designers and engineers ..."

ERNEST V. GENT
Executive Vice President, American Zinc Institute Inc., New York

Technical Progress

"... Materials are available for producing an amorphous mixed oxide-chromate coating on aluminum alloys which gives unusual protection to unpainted aluminum and also provides a good paint base ..."

R. C. GIBSON
Technical Director, Parker Rust Proof Co., Detroit

"... Inspection and identification must be done as the mill produces material or complete and integrated production is impossible ..."

RAYMOND E. GINN
Vice President in Charge of Sales, Jas. H. Matthews & Co., Pittsburgh

"... We introduced surface finish quality control into our organization with a symposium which included all engineering personnel, all supervisory employees and the entire quality control department ..."

A. A. GOODMAN
Manager, Quality Control, Yale & Towne Mfg. Co., Philadelphia

"... Increased use of special alloys has brought the use of liquid carbon dioxide as a tool coolant into general application. It's equally valuable in the tool preparation ..."

A. J. GRANATA
Manager of General Technical Sales, Pure Carbonic Co., Air Reduction Co. Inc., New York

"... Design in future plant layout will incorporate advantages offered through full-flow, belt-type filtration to permit not only greater flexibility but greater production efficiency ..."

GEORGE L. GUYMON
Vice President and General Sales Manager, Industrial Filtration Co., Lebanon, Ind.

"... Difficulties in getting really big steel castings make it necessary to bring some of them in from Europe. Domestic capacity is adequate for normal use and temporary expansion is uneconomical ..."

JOHN HOWE HALL
Metallurgist, Swarthmore, Pa.

Forum on

"... Greater consideration will be given to finishing metals in their raw and unformed shape and the protecting of such finishes during fabrication ..."

M. B. HAMMOND
Vice President, Standard Steel Spring Co., Coraopolis, Pa.

"... As one step, to eliminate the possibility of the user getting the wrong alloy steel, we spark test all alloys to double check for analysis variation from bar to bar ..."

C. L. HARDY
President, Joseph T. Ryerson & Son Inc., Chicago

"... The lubrication foreman—the once lowly grease man—has new stature in the operating group in industry as a result of management's recognition of efficient lubrication's tie with profitable operation ..."

E. RALPH HARRIS
Manager Industrial Sales, Alemite Division, Stewart-Warner Corp., Chicago

"... Advantages of interrupted quenching may be found in eliminating the possibility of cracking or in lessening dimensional changes and warpage in hardening processes ..."

F. E. HARRIS
Dow Furnace Co., Detroit

"... Standardization of special designs of tools for specific materials will be instituted in the face of current problems of raising productivity without raising costs ..."

S. B. HELLSTROM
President, Detroit Tap & Tool Co., Detroit

"... Continuing improvement, both in equipment design and in solvent manufacture, will promote the expected growth of vapor degreasing as one of the most versatile and positive metal cleaning procedures ..."

P. R. HENDRIXSON
Electrochemicals Dept., E. I. du Pont de Nemours & Co. Inc., Wilmington, Del.

"... Cold welding, a process which requires no heat to join either similar or dissimilar metals, is being tried in applications where normal welding methods are difficult or even impossible ..."

F. R. HENSEL
Vice President in Charge of Engineering, P. R. Mallory & Co. Inc., Indianapolis

"... To men entering the metal stamping field we continue to stress the importance of knowing developments that are created through practical experience ..."

JOHN F. HERKENHOFF
President, Minster Machine Co., Minster, O.

"... Continuously annealed steel strip for tin plate was produced in a direct fired unit during 1952 at a production rate averaging more than 142 tons per turn up to 226 tons ..."

FREDERIC O. HESS
President, Selas Corp. of America, Philadelphia

"... We see a continuation of the trend toward building more automatic functions, both into metalworking machines themselves and into the handling of parts to and from these machines ..."

E. M. HICKS
Vice President, Norton Co., Grinding Machine Division, Worcester, Mass.

"... There is a marked trend to larger parts incorporating several stampings into one. This means larger presses. We see also greater use of stampings with forged or machined parts ..."

CARTER C. HIGGINS
President and General Manager, Worcester Pressed Steel Co., Worcester, Mass.

"... In porcelain enamels we have developed the first titanium cover coats available with pastel colors built in. Promising uses are bathtubs, sinks, architectural installations, refrigerators, and hollow ware ..."

E. HOGENSON
Executive Vice President, Chicago Vitreous Enamel Products Co., Chicago

"... Work on furnace brazing of automobile engine blocks and radiators has resulted in a method for producing a variety of parts by a combination permanent mold-furnace brazing process ..."

G. O. HOGLUND

Chief Welding Engineer, Process Development Laboratories, Aluminum Co. of America, Pittsburgh

"... Decreased alloying elements in heat treatable steels has made it necessary to extend the use of the super quench oils and has increased the use of carbonitriding to increase hardenability ..."

W. H. HOLCROFT

Executive Vice President, Holcroft & Co., Detroit

"... Neutral salt baths will continue to expand in the fields of isothermal annealing, descaling, heating for forming and heating for forging ..."

A. F. HOLDEN

President, A. F. Holden Co., New Haven, Conn.

"... Using the powder lance, slag is removed from blast furnace windboxes in one-quarter the time formerly required when employing a standard oxygen lance ..."

E. M. HOLUB

Development Engineer, Linde Air Products Co., Union Carbide & Carbon Corp., New York

"... Natural gas distribution lines spreading into the Northeast have made available a better quality and more moderately priced fuel gas for heat treating furnaces in that area ..."

JOHN G. HOOP

Industrial Heating Engineer, Westinghouse Electric Corp., Pittsburgh

"... Within the year, 3000 pound non-welded 24-inch wide coils of quality brass will be introduced ..."

KENNETH T. HOWELL

Sales Promotion Manager, Scovill Mfg. Co., Waterbury, Conn.

Technical Progress

"... Development of artificial silicon carbide abrasive wheels has answered the need for a satisfactory substitute for critically-short diamond bort in grinding of cemented carbide tools ..."

E. C. HUGHES
Vice President, Bay State Abrasive Products Co., Westboro, Mass

"... There is a growing awareness among quality control experts that non-destructive testing provides not only a means of finding flaws but a means of helping to prevent them ..."

W. C. HUTCHINS
Special Products Section, General Electric Co., Schenectady, N. Y

"... In galvanizing operations, mechanical drossing now appears to be practical. The method requires less than half the labor and much shorter time than hand drossing ..."

WALLACE G. IMHOFF
President, Wallace G. Imhoff Co., North Highland, Calif

"... Carburizing is not just a method of putting carbon into the surface of the steel, but a method of obtaining physical properties that are unique to the engineering application ..."

H. N. IPSEN
President, Ipsen Industries Inc., Rockford, Ill

"... Chromate dipping of aluminum gives corrosion resistance equalled to electrolytic anodizing and eliminates racks and long processing time. Film is not hard as anodized coating ..."

H. C. IRVIN
President, Allied Research Products Inc., Baltimore

"... The Swiss SAP process utilizes powdered aluminum containing oxide films which inhibit grain growth to produce wrought alloys having remarkably good high temperature strength from 600 to 1000° F ..."

J. H. JACKSON
Battelle Memorial Institute, Columbus, O

"... There is special interest in furnaces of large holding capacity to provide a valuable cushion between melting and production departments for maximum yield of good castings ..."

W. R. JAESCHKE
Consulting Metallurgical Engineer, Whiting Corp., Harvey, Ill

"... In the design of machine tools for the future I see higher speeds and higher feeds and higher horsepower all the way through ..."

GEORGE H. JOHNSON
President, Gisholt Machine Co., Madison, Wis.

"... Expansion of centrifugal casting industry is to be expected along with the increases in jet aircraft engine production ..."

JOHN W. JUPPENLATZ
Chief Metallurgist, Lebanon Steel Foundry, Lebanon, Pa

"... Great effort has been put forth to reduce and simplify maintenance and sludge removal problems inherent in metal cleaning equipment removing solid soils ..."

T. J. KEARNEY
Chief Engineer, Detrex Corp., Detroit

"... Greater uniformity, good mechanical properties, and comparable machining characteristics are exhibited in screw stock produced in open hearth and arc furnaces ..."

J. K. KILLMER
Bethlehem Steel Co., Bethlehem, Pa.

"... Of major and growing importance is the recognition of the value of improved ore structure on blast furnace production ..."

CLARENCE DAVID KING
Assistant Vice President, U. S. Steel Co., Pittsburgh

Technical Progress

"... Outstanding aims are to achieve higher speeds on press equipment. In addition the industry is constantly looking for ways to keep secondary operations to a minimum ..."

R. R. KING
V & O Press Co., Hudson, N. Y.

".... Aluminum bronze, properly processed and of the iron bearing single phase type shows attractive characteristics as a new bolting material for use in salt water, many acids and alkalis ..."

J. F. KLEMENT
Technical Director, Ampco Metal Inc., Milwaukee

"... New copper brazing paste containing iron permits joining of rather loosely fit stamped parts and speeds-up ordinary assembly by allowing hand push joining rather than mechanical or hydraulic press assembly ..."

L. G. KLINKER
Chief Engineer, Chemicals-Pigments-Metals Division, Glidden Co., Hammond, Ind.

"... After white brass-chromium plating of 10,000 steel screws, it was discovered that it was necessary to draw the steel which was performed at 500° F without deleterious effect on the plate ..."

W. B. KNIGHT
President, Knight Plating Co., Detroit

"... Every conceivable type of metal used in jet engines ranging from plain carbon steel through aluminum clad, low alloy, austenitic stainless, to the high temperature alloys is welded with inert gas-shielded tungsten arc process ..."

K. H. KOOPMAN
Development Engineer, Linde Air Products Co., Union Carbide & Carbon Corp., New York

"... I predict continuation of the trend towards automatic controls and positioning, greater accuracies, higher feeds and speeds, greater rigidity and horsepower and improvements in the direction of simplicity ..."

RALPH J. KRAUT
President, Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.

"... Wide application will be found for the parallel-transverse technique in welding railroad car center sills and plate assemblies where the problem presented by poor fitup is solved by its inherent advantages ..."

R. A. KUBLI
Development Engineer, Linde Air Products Co., Union Carbide & Carbon Corp., New York

"... Both inert-gas shielded arc welding processes can weld aluminum, magnesium, chrome-nickel steels, straight chrome steels, nickel, nickel alloys, copper, copper alloys—metals with special welding problems ..."

A. N. KUGLER
Mechanical Engineer, Air Reduction Sales Co., New York

"... One factor contributing to the apparent time lag in equipping defense plants stemmed from the new and constantly changing designs of modern armament ..."

ALFRED KULLMAN
Vice President and Works Manager, American Tool Works Co., Cincinnati

"... With future peacetime markets stifled by trebled production now, and foreign competition on the rise, the machine tool industry faces the greatest challenge in its history ..."

JOHN J. LADDEN
General Manager, O. S. Walker Co. Inc., Worcester, Mass.

"... There will be greater demand for powder metallurgy products of ferrous base, a demand for units of larger size, and increased requirements with regard to physical properties ..."

A. J. LANGHAMMER
President, Amplex Oilite Products, Chrysler Corp., Detroit

"... Pearlitic malleable production is being undertaken by growing list of foundries. Its use is increasing wherever rigidity, high strength and wear resistance are important factors ..."

JAMES H. LANSING
Technical & Research Director, Malleable Founders Society, Cleveland

"... In stamping, greater availability of coiled material has expanded the use of automatic feeding of stock through progressive operations and final ejection ..."

JAMES M. LEAKE
President, Leake Stamping Co., Monroe, Mich.

"... The speed, accuracy and finish obtainable through the Method X process of electro-machining have been greatly improved and new models incorporating these improvements will be available in 1953 ..."

W. J. LOACH
Firth Sterling Steel & Carbide Corp., Pittsburgh

"... There is hope that restrictions on the use of nickel will be somewhat relaxed and platers are looking forward to the possibility of using the well established copper-nickel-chromium coating for decorative purposes ..."

RICHARD O. LOENGARD
President, United Chromium Inc., New York

"... Alloys based on the titanium-aluminum system are being developed which should compete with stainless steel up to 1100 F ..."

R. A. LUBKER
Associate Chairman, Metal Research, Armour Research Foundation, Chicago

"... A new stainless steel containing approximately 0.8 per cent carbon, 16 chromium, and 18 nickel overcomes manufacturing difficulties due to rapid work hardening of the conventional 18-8 grades ..."

G. V. LUERSSEN
Vice President, Carpenter Steel Co., Reading, Pa.

"... Magnetic alloys are now available in tape as thin as 0.00025-inch making possible higher frequency and lower loss application ..."

CARROLL W. LUFCY
Chief, Magnetics Division, U. S. Naval Ordnance Laboratory, Silver Spring, Md.

Forum on

"... Hopper feeds and conveyorized loading and unloading devices have played an important part in increasing broaching production and should find increased use in the future ..."

ARVID LUNDELL
President, Colonial Broach Co., Detroit

"... Cleaning research is directed towards increasing the detergent properties of basic alkalies and acids by addition of some of the newer organic and inorganic chemicals now available in commercial quantities ..."

G. A. LUX
Technical Education Director, Oakite Products Inc., New York

"... Industry no longer makes material handling the stepchild of longer-established functions. Handling supervisory personnel have achieved equal rank with other department heads ..."

R. W. MALLICK
Executive Department, E. Pittsburgh Division, Westinghouse Electric Corp., E. Pittsburgh

"... The modern trend in coolant clarification systems is toward central systems. These embody one or more units to filter all coolant from all machines in the systems ..."

JOHN R. MC COY
Manager Technical Service, Hanan-Crane Corp., Lebanon, Ind.

"... There seems to be a definite trend towards standardization of alloy chemistry for elevated temperature service and a simmering down of alloys being considered for use under combined high stress and temperature ..."

C. L. MC CUEN
General Manager, Research Laboratories Division, General Motors Corp., Detroit

"... Many thousands of small and medium-sized metalworking plants scattered throughout the country, with their diversified production, continue to rely primarily on essentially standard machine tools ..."

L. D. MC DONALD
Executive Vice President, Warner & Swasey Co., Cleveland

Technical Progress

"... Where tool reconditioning is costly or where grinding facilities are not available, carbide disks which can be indexed to a new cutting edge will find increasing use ..."

PHILIP M. MC KENNA
President, Kennametal Inc., Latrobe, Pa.

"... Ultrasonic immersed inspection techniques at higher frequencies will detect microscopic as well as macroscopic defects in aluminum ..."

R. C. MC MASTER
Battelle Memorial Institute, Columbus, O.

"... High labor, transportation and operating costs result in the greatest possible pressure for new methods and equipment in the steel industry ..."

HARRY W. MC QUAID
Consultant, Cleveland

"... Cutting fluids received renewed attention in the field of machining—particularly with respect to improving their ability to penetrate the chip-tool interface by improved methods of application ..."

M. EUGENE MERCHANT
Assistant Director of Research, Cincinnati Milling Machine Co., Cincinnati

"... New development in coated abrasive machinery is the centerless grinder using belts not only for grinding but, through additional belts, for the control of feed ..."

HENRY R. MERRILL
Industrial Sales Manager, Behr-Manning Corp., Troy, N. Y.

"... Rapid removal of rust is done by making work the cathode in a solution of alkaline derusting salts. There is no dimensional change and no formation of smut or pits ..."

WALTER R. MEYER
President, Enthone Inc., New Haven, Conn.

"... Next step to expanded mechanized chip removal is standardization of assemblies. This economy, plus the reduced machine downtime and elimination of manual handling, indicates expanded acceptance ..."

G. H. MEYFARTH
Vice President, May-Fran Engineering Inc., Cleveland

"... Machinery for making foundry molds and cores for castings of all types is now being produced for reducing to a minimum labor required to produce a ton of castings ..."

LEON F. MILLER
Vice President, Machine Division, Osborn Mfg. Co., Cleveland

"... Outstanding production records being made today in the steel industry are to a very considerable extent the result of advances in analyzing control systems ..."

W. E. MILLER
Steel Mill Section, General Electric Co., Schenectady, N. Y.

"... In ultrasonic testing both higher and lower testing frequencies are being investigated with respect to inspection costs as well as equipment performance ..."

WILLARD C. MINTON
Ultrasonics Application Engineer, Sperry Products Inc., Danbury, Conn.

"... Outstanding developments have been made in rustproofing oils and waxes which have resulted in infinitely longer corrosion prevention with thin film thickness ..."

A. J. MITCHELL
President, Mitchell-Bradford Chemical Co., Stratford, Conn.

"... Low-hydrogen electrodes are no longer considered emergency tools, but are used because of superior physical properties, many being custom made to match heat treating properties of alloy steels ..."

M. O. MONSLER
Manager, Welding Equipment Division, Harnischfeger Corp., Milwaukee

"... Heavy equipment makers expect lively demand from further conveyorization of steel mills, brass fabricating mills, foundries and steel fabricating plants. Backlogs appear good for heavy-work specialists ..."

FRANK E. MOORE
Chairman of Board, Mathews Conveyor Co., Ellwood City, Pa.

"... There is a definite trend toward automatic pressurized lubrication and complete enclosing of all operating mechanism of mechanical presses along with better and safer controls for the electrical system ..."

E. K. MORGAN
General Sales Manager, Press Division, Danly Machine Specialties Inc., Chicago

"... Use of tailored steel for diversified applications of the metal stamping industry will come into being and the right steel for the right job will be the rule ..."

GEORGE B. MOSELEY
General Sales Manager, Firestone Steel Products Co., Akron

"... There is a trend toward design of parts as die forgings which were considered too large even a year or two ago ..."

WALDEMAR NAUJOKS
Special Project Engineer, Ladish Co., Cudahy, Wis.

"... The ZK60 alloy is now the highest strength magnesium extrusion material and magnesium-rare earth-zirconium alloys are taking their full place in the casting field for use at elevated temperatures ..."

C. E. NELSON
Technical Director, Magnesium Department, Dow Chemical Co., Midland, Mich.

"... Porcelain enameling of aluminum has progressed rapidly. Wherever the light weight advantages of aluminum are desired, enameling adds to the durability and attractiveness of the product ..."

F. W. NELSON
Asst. Director, Ceramic Research and Development, A. O. Smith Corp., Milwaukee

"... It has been possible to roll titanium from 0.010-inch to 0.0005-inch gage, 95 per cent total reduction, without an intermediate anneal on Sendzimir mills ..."

A. I. NUSSBAUM
American Silver Co., Flushing, N. Y.

"... Flash welding continues to find increased application on hard to weld materials, such as titanium, where it produces the most satisfactory joints of any of the welding methods ..."

I. A. OEHLER
Director of Metallurgy and Research, American Welding & Mfg. Co., Warren, O.

"... Deteriorating quality of raw materials makes blast furnace research essential. Some healthy approaches have been made and there must be more of them ..."

BRUCE S. OLD
Vice President, Arthur D. Little Inc., Cambridge, Mass.

"... Some parts previously made by adding hours of machining to solid or semi-formed stock are now produced by induction brazing together simpler parts at an overall lower cost ..."

H. B. OSBORNE JR.
Technical Director, Ohio Crankshaft Co., Cleveland

"... Tomorrow's production equipment will require higher capital investment, but it will produce more per unit and with lower maintenance costs ..."

J. E. OTIS JR.
President, Dodge Mfg. Corp., Mishawaka, Ind.

"... Incorporating an entirely new idea of spray booth design and performance, we have developed a traveling exhaust chamber for painting large portable objects such as locomotives, railroad cars, busses and truck trailers ..."

L. M. OWEN
Engineer, Transportation Division, DeVilbiss Co., Toledo, Ohio

Technical Progress

"... While roll-making processes remain unchanged fundamentally, roll mixtures are continually being improved, foundry practice refined, and heat treatments drastically modified ..."

J. R. PATTERSON
Vice President, Mackintosh-Hemphill Co., Pittsburgh

"... In carburizing, carbonitriding, and salt bath hardening, the trend continues toward automatic control and mechanization, with continuous equipment giving greatest economy in large scale production ..."

R. J. PETERS
Chief Metallurgist, Warner Gear Div., Borg-Warner Corp., Muncie, Ind.

"... Engineers are giving careful consideration to whether steels having better welding characteristics and better low temperature strength properties should be required for plates having a thickness of more than one inch ..."

FRED L. PLUMMER
Director of Engineering, Hammond Iron Works, Warren, Pa.

"... Gages and measuring instruments have become management's mechanical supervisors that constantly protect established standards. They make certain the flow of parts to the assembly line are repetitively uniform ..."

LOUIS POLK
President, Sheffield Corp., Dayton, O.

"... The trend toward shaving which started approximately ten years ago has steadily gained impetus particularly with respect to large marine propulsion gears ..."

WALTER S. PRAEG
President, National Broach & Machine Co., Detroit

"... American manufacturers are now satisfying the domestic fine and quality steel market as well as making improvements in production of basic steel ..."

FRANK B. RACKLEY
President, Jessop Steel Co., Washington, Pa.

Forum on

"... Trend away from bessemer and duplex practice to straight high hot metal and ore practice is indicated. Disadvantages outweigh the increase in output which duplex practice permits ..."

C. F. RAMSEYER
President, Ramseyer & Miller Inc., New York

"... With restrictions imposed by M-41—even as ammended on Nov. 17—demand is building up for machine tools that will keep the industry busy even after defense requirements are met ..."

J. A. RATTERMAN
President, Monarch Machine Tool Co., Sidney, O.

"... Most outstanding development in open hearth operation is the concentration of steel plant management on improved use of equipment already available ..."

L. F. REINARTZ
Vice President, Armco Steel Corp., Middletown, O.

"... Production of aluminum will again double by 1953 when the rate of output will be over 3 billion pounds per year ..."

DAVID P. REYNOLDS
Vice President, Reynolds Metals Co., Louisville

"... Use of a new dye penetrant inspection method permits accurate evaluation of an almost unlimited number of inspections. It can be used before or after any processing operation ..."

GORDON RICE
Process Engineer, Turco Products Inc., Los Angeles

"... Where equipment has to be operated under conditions of higher productivity in speeds and pressures, as in the steel industry, lubricants become a major factor for successful operation ..."

JOSEPH A. RIGBY
Vice President Engineering—Sales, Brooks Oil Co., Pittsburgh

Technical Progress

". . . Shell molding removes many hazards, particularly those due to the human element. Closer tolerances, smoother surfaces and more dependable physical characteristics are points in its favor . . ."

HAROLD J. ROAST
Bronze Foundry Consultant, Hampstead, Que.

". . . If the demand for steel is maintained through 1953, the end of the year will still see a metallurgical coke shortage of approximately three million tons per year . . ."

PHILIP S. SAVAGE
Vice President, Donner-Hanna Coke Corp., Buffalo

". . . Both the heavy press program and a power program have created a demand for forgings of the largest possible sizes. Indications are that this will be a continuing demand . . ."

A. O. SCHAEFER
Vice President in Charge of Engineering and Manufacturing, Midvale Co., Philadelphia

". . . Present gearmaking capacity seems adequate for the forseeable future and takes into account possible mushrooming of military needs . . ."

JOHN C. SEARS
American Gear Manufacturers Association, Pittsburgh

". . .Higher production costs place greater emphasis on need for mechanized material handling. Future demand for mass handling equipment is assured . . ."

LESTER M. SEARS
Chairman of Board, Towmotor Corp., Cleveland

". . . Quality and cost of the final products made in blast furnaces and steel plants are materially affected by proper preparation and handling of the required raw materials . . ."

JAY J. SEAVER
Jay J. Seaver, Engineers, Chicago

Forum on

"... A look into 1953 suggests that it will see the machine tool industry transposing from a seller's to a buyer's market for the first time since pre-Korea ..."

HENRY D. SHARPE JR.
President, Brown & Sharpe Mfg. Co., Providence, R. I.

"... Trend toward lift truck operations without pallets will expand possible applications of power handling equipment. Better maneuverability conserves floor space, adding a new dimension to handling efficiency ..."

F. J. SHEPARD JR.
Treasurer, Lewis-Shepard Products, Watertown, Mass.

"... Improvements in resistance welding have been focused on labor saving, not only in increased number of welds per welder, but also in mechanical handling of material ..."

G. N. SIEGER
President, S.M.S Corp., Detroit

"... Programs are being planned around new welding techniques with an eye toward current as well as future needs. An example is the widespread adoption of one or more of the inert-gas shielded arc processes ..."

G. V. SLOTTMAN
Vice President, Air Reduction Co. Inc., New York

"... Basic cupola lining enables cleaner melting with less coke. Water-cooled cupola installed in a dozen European Meehanite foundries produces a hotter, cleaner and more fluid iron ..."

OLIVER SMALLEY
President, Meehanite Metal Corp., New Rochelle, N. Y.

"... In 1953 we will see an expanded use of titanium as a production material for aircraft forgings. Research has laid the ground work ..."

C. H. SMITH JR.
President, Steel Improvement & Forge Co., Cleveland

Technical Progress

"... A satin finish is produced on aluminum with a cycle involving an etching and a desmutting operation. The latter removes the black smut that develops during etching due to alloying elements ..."

SAMUEL SPRING

Inorganic Research Dept., Research & Development Div., Pennsylvania Salt Mfg. Co., Wyndmoor, Pa.

"... Quality evaluation should be based on results from a sample of adequate statistical size, determined on basis of quality level required and poorest quality that can be tolerated on occasion ..."

JEROME R. STEEN

Director, Quality Control, Sylvania Electric Products Inc., New York

"... In the near future instruments for controlling and recording atmospheres will be as common on metallurgical furnaces as controlling and recording temperature instruments are today ..."

CARY H. STEVENSON

Lindberg Engineering Co., Chicago

"... In our laboratories, highly precise methods have been developed for the evaluation of immersion cleaners and electro-cleaners for steel, using radioactive stearic acid as the soil ..."

H. R. SUTER

Director of Application Research, Wyandotte Chemicals Corp., Wyandotte, Mich.

"... Improvement of important properties of refractories is resulting in substantial increases in furnace lining life despite severity of operating conditions ..."

S. M. SWAIN

Director of Research, North American Refractories Co., Cleveland

"... Eliminating danger of misapplication is a major maintenance problem solved with a multi-purpose grease. Simplification of purchasing, storage, inventory and shipping are other advantages ..."

B. G. SYMON

Manager Industrial Lubricants, Shell Oil Co., New York

Forum on

"... Automatic pouring unit for aluminum die casting is based on low frequency induction furnace. Molten metal can be poured both automatically and accurately ..."

MANUEL TAMA
Vice President, Ajax Engineering Corp., Trenton, N. J.

"... We have engineered a new line of radiation pyrometers, based on the double-mirror 8890 Rayotube detector, which merely sight upon the work and generate an emf proportional to temperature ..."

A. E. TARR
Leeds & Northrup Co., Philadelphia

"... Symptomatic of industry's recognition of assembly as a potential source of major savings is the tendency of a growing number of companies to bring their assembly problems out in the open and ask for advice ..."

W. H. TAYLOR
General Sales Manager, Tinnerman Products Inc., Cleveland

"... X-ray machines for radiography became available during 1952 which are small in size, light in weight, and yet have the capacity of similar units of conventional design ..."

R. G. TOBEY
X-ray Division, Eastman Kodak Co., Rochester, N. Y.

"... Competition for materials must be met in only one way: We must use the unique characteristics of each material in the best possible manner ..."

J. R. TOWNSEND
Bell Telephone Laboratories, Murray Hills, N. J.

"... Because the cost of manpower is continually rising, the machine must step in and produce more things cheaper. Special machines will be more important ..."

FRANCIS J. TRECKER
President, Kearney & Trecker Corp., Milwaukee

Technical Progress

"... Application of electronic servomechanisms to the metal cutting industries has taken definite form during the last year. Greater use in other industries is expected ..."

GEORGE T. TRUNDLE JR.
President, Trundle Engineering Co., Cleveland

"... For overhead handling, the trend moves toward more automatic-cycle operation. Floor handlers demand higher capacities, better manipulation through attachments ..."

ELMER F. TWYMAN
Vice President, Yale & Towne Mfg. Co., Philadelphia

"... A general recommendation for machining zirconium would be to use a slow speed, light feed and a fairly heavy cut. The tool must be kept cutting at all times ..."

STEPHEN F. URBAN
Director of Research, Titanium Alloy Mfg. Division, National Lead Co., Niagara Falls, N. Y.

"... Suppliers of shell molding equipment will find it a challenge to provide machinery and patterns to meet existing demand, let alone the newly opened market of the future ..."

E. I. VALYI
President, Shellmold & Machinery Co. Inc., New York

"... Electric motor drives must be further simplified to permit application of power directly at the point of use. Complicated mechanical arrangements must be eliminated ..."

J. L. VAN NORT
Applied Engineering, Reliance Electric & Engineering Co., Cleveland

"... Synthetic fiber filter media permit improvement of cloth dust and fume filters. Uses are extended to higher temperature and chemical problems ..."

W. O. VEDDER
Manager, Dust Control Department, Pangborn Corp., Hagerstown, Md.

"... Mechanical descaling has necessitated development of a completely new series of wire-drawing lubricants which will assume increased importance as the technique becomes more popular ..."

H. GREY VERNER
Technical Director, R. H. Miller Co. Inc., Homer, N. Y.

"... Construction of thin wing jet aircraft has created the necessity for forming heavier gage aluminum and new, tougher metals, thereby causing problems in reducing secondary operations ..."

DAVID C. VERSON
President, Verson Allsteel Press Co., Chicago

"... Higher wages give labor-saving methods top priority. Steel strapping industry will help do the job in the tough area of interplant materials movement and effective use of storage facilities ..."

H. G. WALTER
President, Gerrard Steel Strapping Division, U. S. Steel Co., Chicago

"... Requirements are growing for special fasteners to lower assembly cost, improve strength and appearance, and fill special needs including high temperature and pressure requirements by the military ..."

W. G. WALTERMIRE
Chief Products Engineer, Lamson & Sessions Co., Cleveland

"... With the use of induction stirring, control of metal in the molten state is vastly improved, resulting in a metallurgically better product with greater economy ..."

HARRY F. WALTHER
Superintendent of Melting, Steel & Tube Division, Timken Roller Bearing, Canton, O.

"... Joint efforts of conveyor, tooling and electronic engineers are the key to cost-saving on material handling problems. Most significant has been development of electronic control equipment ..."

JERVIS C. WEBB
Executive Vice President & General Manager, Jervis B. Webb Co., Detroit

Technical Progress

"... Nondestructive testing is being used at the earliest possible stage of manufacture to insure against material having defects which would heretofore not be detected until after final operations ..."

S. A. WENK
Battelle Memorial Institute, Columbus, O.

"... Refinements in machining have been accomplished by use of readjusted feeds and speeds, improved use of cutting and by work simplification ..."

E. K. WHEAT
Supervisor, Engineering Section, Arms Research & Development Division,
Remington Arms Co. Inc., Ilion, N. Y.

"... Many of the cupola's ills can be cured by a tuyere that forces air horizontally before it is deflected vertically. Operations are improved and maintenance reduced ..."

WILFRED H. WHITE
Metallurgist, Jackson Iron & Steel Co., Jackson, O.

"... Single stack annealing furnaces make the process as close to a continuous line as is possible and still allow a multiplicity of treatments ..."

J. L. WHITTEN
Vice President, Lee Wilson Engineering Co. Inc., Cleveland

"... With the great advance of instrumentation and electronification of all phases of industry has come the need for metal chassis, panels, housings, etc., in which to mount these components ..."

THEODORE A. WIEDEMANN
Weidmann Machine Co., Cleveland

"... A new aluminum alloy, designated XA78S, was made available to airplane builders for experimental use. It is 10 per cent higher in tensile and yield strength than 75S with same elongation and fatigue properties ..."

J. R. WILLARD
Sales Engineering & Development Division, Aluminum Co. of America, New Kensington, Pa.

"... Accidents are no longer a normal part of industrial jobs. Industry will meet any new challenge to worker safety and continue to improve accident prevention records ..."

THOMAS A. WILLSON
President, Willson Products Inc., Reading, Pa.

"... Progress has been made in lowering the alloy metal in springs. Significant decrease in nickel and molybdenum consumption is cutting costs, too ..."

G. D. WILSON
Chief Metallurgist, Barnes-Gibson-Raymond Div., Associated Spring Corp., Plymouth, Mich.

"... American designers are still not taking full advantage of worm gear speed reduction. Trend in that direction is still many years behind European users ..."

L. O. WITZENBURG
General Sales Manager, Cleveland Worm & Gear Co., Cleveland

"... Lower maintenance, longer life are benefits to be gained by constructing from a long-term approach. A primary factor must be selection of flooring material that will last ..."

CARL F. YTTERBERG
President, Kalman Floor Co., New York

"... There is every reason to believe that ingots larger than the 32-inch diameter size can be continuous-cast. Equipment size is the only drawback ..."

PAUL ZIEGLER
Division of Metallurgical Research, Kaiser Aluminum Co.

"... Most outstanding development was the replacement of the old batch softening methods by continuous lead softening and desilvering ..."

ROBERT L. ZIEGFIELD
Secretary, Lead Industries Association, New York

If you make hollow parts, we'll give you the hole

THE center hole's already in Timken® seamless steel tubing. There's less time wasted on machining; you get more parts from each ton of steel you buy because there's less scrap.

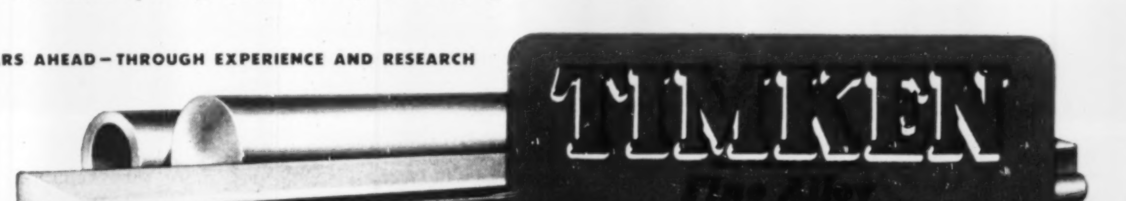
Often, finish boring's the first step—screw machine stations can be used for other operations. You get greater machine capacity without adding machines.

Higher quality in your product is assured because the piercing process by which Timken steel tubing is made is essentially a forging operation. The tubing has a uniform spiral grain flow for greater strength and a refined grain structure which brings out the best in the quality of the metal.

And to help you save even *more* steel, the Timken Company's tube engineering service will study your problem and recommend the most economical tube size for your job guaranteed to clean up to your finished dimensions.

For further information on the uses of Timken seamless steel tubing, write The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH



SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING

FORUM ON TECHNICAL PROGRESS

Steelmaking

New capacity plus more production from existing facilities lift steel output to 10 million tons monthly. More attention given to raw materials, operating techniques provides steel for dual economy

Deteriorating quality of raw materials makes blast furnace research essential. Unfortunately, new knowledge evolves at a snail's pace

NEVER before in its history has the steel industry been in a more dynamic state of development than it is now. Oddly enough, it is not the kind of development that mushrooms many new mills into being. It is more an expansion from within, typified by expanded brain power rather than added production muscle.

For years the flawless formula of industry expansion — more plants equals more output—was successfully used to keep the tonnage figures in line with consumption. But with high-grade ore and direct coking coal getting scarce, shipping and operating costs up, not to mention zooming labor costs, the old tried-and-true formula is showing signs of obsolescence. The trend now is—get more out of existing facilities.

Last year saw many advances in steelmaking, together with the fruition of plans conceived in past years. No phase of the industry, from raw materials to finished product, is escaping this program of increased production through increased efficiencies.

Coke Shortage — Installation of new coking batteries and the rehabilitation of old units add to the much-needed furnace coke supply. However, if the demand for steel is maintained through 1953, and most steelmen think it will, the end of the year will see a metallurgical coke shortage of approximately 3 million tons. Much of the new tonnage installed to meet the needs of the new steel plant facilities has been nullified by the abandonment of three commercial coke plants during 1952.

New coke oven construction continues to emphasize simplicity and ruggedness. Spray type scrubbers have followed spray saturators as standard equipment. Most new plants are producing light oil only and shipping to large volume refining plants where greater economy and more recovery products can be realized.

Better Quality—Improved preparation plants installed by many of the commercial and captive coal producers have resulted in better coking coals, and production of metallurgical coke capable of increasing the capacity of existing blast furnaces. New plants are tending to install better mixing facilities with more mixer bins, and old plants are adding bins to the inadequate number that have usually been provided.

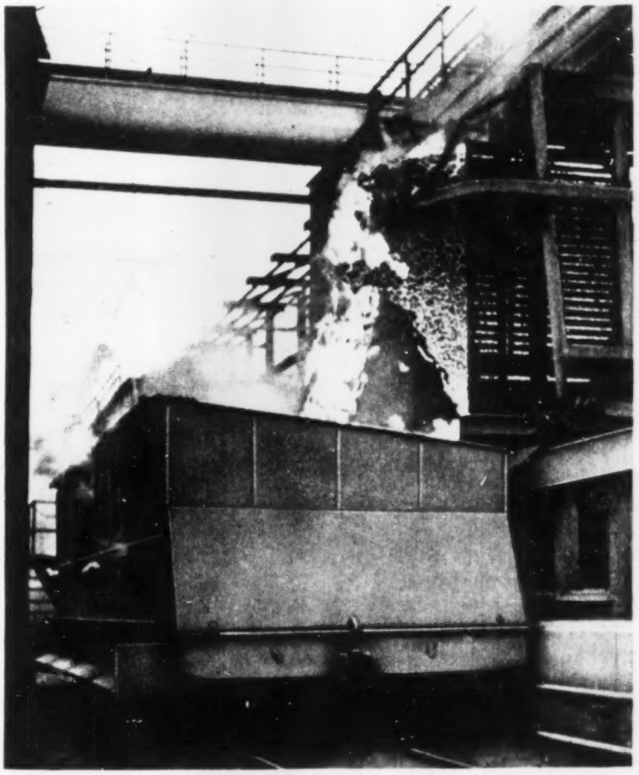
Blast furnace thermal balance calculation indicates that heat volume consumed by the iron, per ton of iron produced, is always a minor percentage of the total heat required for its production. Therefore, lack of any signs indicating prospective reduction in cost of coke production emphasizes the importance of intensive study to reduce heat consumption by the gangue disposal ractions.

The Ore Race—Mesabi ore of the quality and quantity shipped in the last 50 years is approaching exhaustion, but producers in both the Minnesota and Michigan ranges are facing up to this crisis —they're learning to use the plentiful taconites, confident that their customers can be taken care of in the future.

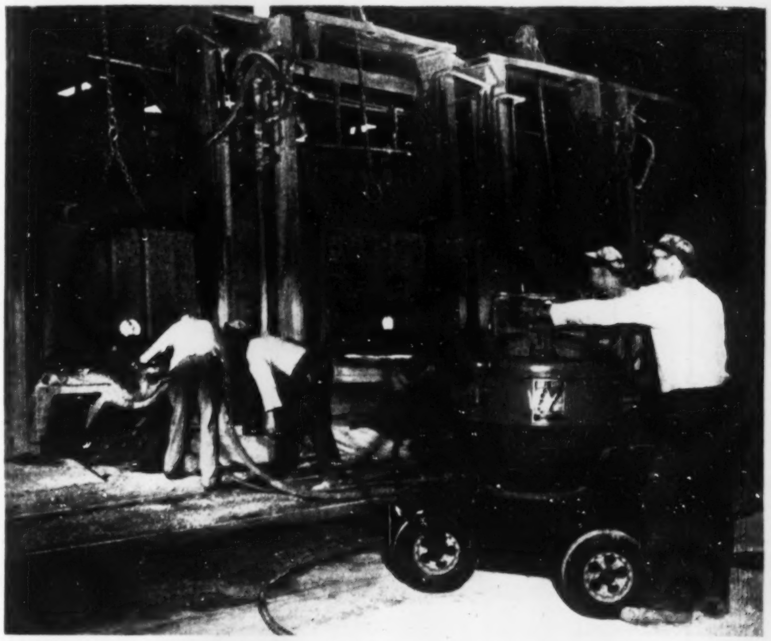
The Erie Mining Co. plant at Aurora and the Reserve Mining Co. plant at Babbitt are already operating single beneficiating units, and the Oliver plant near Mountain Iron will start production early this year. These are the forerunners of the multiunit plants to come later. Reserve is already hard at work constructing its $160 million plant near Beaver Bay on the north shore of Lake Superior, building a harbor and a railroad to connect the Babbitt plant to the system. Erie and Oliver also have large expansion programs, and it is estimated that by 1957, 5-7 million tons of tailor-made blast furnace concentrate will be feeding lower lakes furnaces annually.

Foreign Ore Insurance—Impending end of direct-shipped range ores has spurred the development activities in foreign ore fields. Bethlehem's Sparrows Point plant and now U. S. Steel's Fairless Works depend largely on foreign ores. Both of these mills were built on the seaboard to take advantage of foreign supplies and thus reduce the drain on Lake Superior ores.

To the list of names like Hibbing, Ishpeming and Ironwood have been added Labrador, Venezuela and Liberia. Steelmen speak



Metallurgical coke shortages still plague the steel industry, even with additional new batteries and rehabilitated old ones

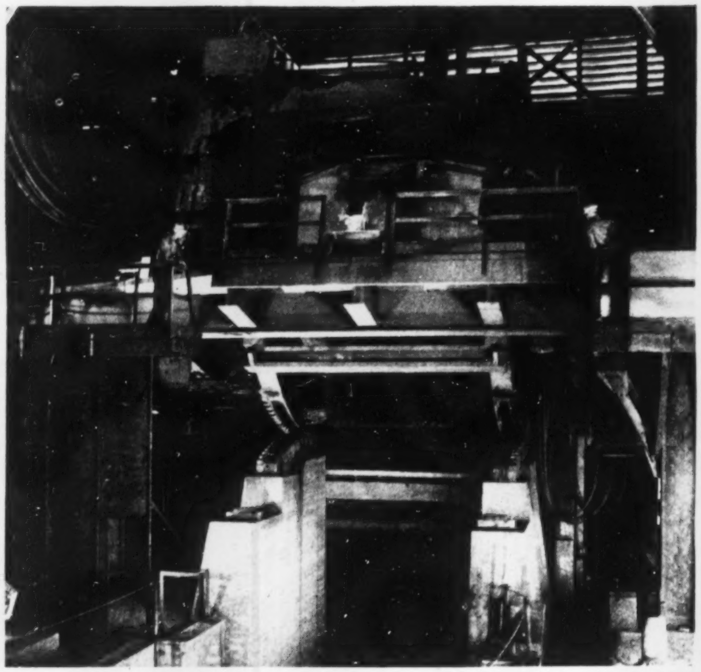


Gun refractory maintenance of furnaces is a growing trend. New chrome-magnesite materials are winning more supporters as familiarly of the latter as they do of the former.

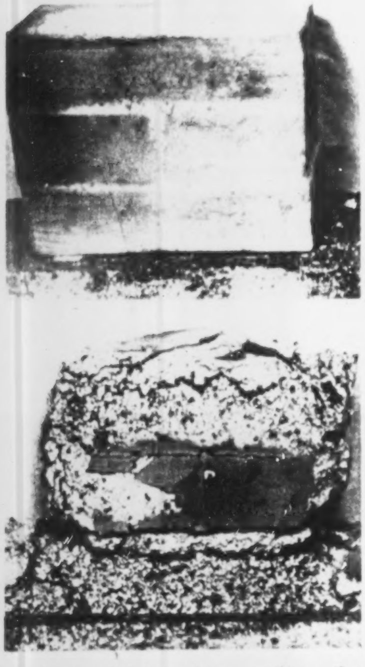
Still a Glamour Girl—Most difficult of all steel plant operations on which to perform research is the blast furnace. The old girl picks up in glamour each year as her role in our national economic strength is more widely recognized, but new fundamental knowledge of the blast furnace process evolves at a snail's pace. Deteriorating quality of raw materials makes this research essential.

Some work of this type is underway. Such things as correlation of blast furnace operation with continuous top gas analysis; high-speed movies of tuyere action; quenching a furnace and digging out the charge; probing into the furnace to obtain information; low shaft furnace experiments in Belgium; and better preparation and handling of materials that go into furnaces are representative of the various approaches to the problem.

Material Sizing—Most satisfactory results in the furnace can be obtained from the use of sized materials which have been crushed, screened, and classified and the different sizes charged separately. Use of multiple layer bedding for both ore and coal results in better uniformity. A number of companies are weighing the advantages to be gained through sizing.



Sizes of electric furnaces continue to grow. This 90-ton giant with induction stirring device will soon be dwarfed by a 120-ton model



Carbon disintegration within the mortar joints has been stopped with a new immunizing agent in the top sample. The other is regular mortar

It appears certain that more blast furnaces will go on high blast top pressure in 1953. As of the middle of October, 11 furnaces were reported to be operating on high pressure and several more still in the construction stage will also use the system. Those now using it are:

	No.
Republic Steel Corp.	
Youngstown	1
Youngstown	3
Cleveland	1
Cleveland	5
Cleveland	6
Warren	
Chicago	
Buffalo	2
Youngstown Sheet and Tube Co.	
Indiana Harbor	1
Wisconsin Steel Co.	
Furnace	1
Colvilles Ltd., Glasgow, Scotland	
Furnace	2

Less Outage Time—Adoption of active preventive maintenance programs as well as improved relining techniques brings decrease furnace outage time and increased pig iron supply. The continued use of carbon is evident with one large furnace relined with this refractory in hearth, bosh and inwall.

A number of furnaces have been equipped with very large blowers, some with 125,000 cfm capacity, with the possible use of greater than normal pressures. Large scale experiments still continue in the application of oxygenated air blast and a number of experiments are being undertaken involving special type charging devices, flux introduction through tuyeres, equalization of air admission through tuyeres, special taphole mixes, and many others reflecting an increased activity in this direction.

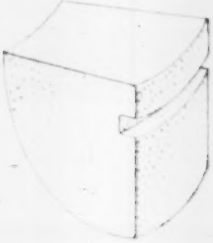
More Fume Control—Blast furnaces must be operated as regularly as possible to avoid "slips" which result in serious air pollution. High top pressure and clean gas bleeders may help uniformity of blast furnace operation, and thus less fumes will be passed into the atmosphere.

For years, most steel plant managements have been cleaning waste

B&W KAOCAST *goes in more furnaces because...*

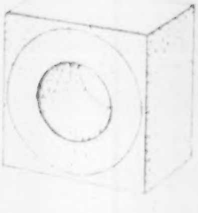
Versatile B&W Kaocast can be molded quickly and easily with your own labor. It can also be cast directly in place or applied with a cement gun. This unique 3000 degree refractory castable has high resistance to spalling and slag attack, low volume change and negligible reheat shrinkage. Consult a B&W Refractories Engineer on your specific applications and see how B&W Kaocast can save money for you.

It cuts inventory



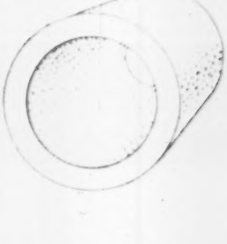
Nose arches for oil heaters were formerly made with special shapes of ordinary firebrick. Switching to quickly moldable Kaocast eliminated need for expensive special-shape inventory . . . minimized delays. In addition, side by side tests proved that Kaocast far outlasted the ordinary firebrick.

It speeds repairs



Kaocast was specified for the charging front of a forging furnace, used to heat heavy pipe ends. The reason? Kaocast linings were molded faster . . . give longer service, could be made when convenient and stored 'til needed.

It lasts longer



A chemical plant found that burner tile for a heating furnace made of an ordinary castable stood up only 3 to 4 months. But Kaocast burner tile stayed on the job 16 months and longer. Thousands of pounds of Kaocast have been used for this and many other applications in this plant.

BABCOCK & WILCOX

R455

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES 161 EAST 42ND ST. NEW YORK 17 NY
WORKS: AUGUSTA, GA.

B&W REFRACTORIES PRODUCTS — B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick B&W Refractory Castables, Plastics and Mortars • OTHER B&W PRODUCTS—Stationary & Marine Boilers and Component Equipment... Chemical Recovery Units . . . Seamless & Welded Tubes . . . Pulverizers . . . Fuel Burning Equipment . . . Pressure Vessels . . . Alloy Castings gases from blast furnaces by means of dust catchers. Several different types of electrostatic precipitators will be tried out in 1953.

More Ingots—The great increase in ingot output obtained in 1952, and which is expected to continue in the current year, has resulted from a number of improved practices in existing shops as well as the construction of some new plants incorporating advanced methods in charging arrangements. The new hot metal plants in all cases involve the production of heats ranging from 250-300 tons with many of the furnaces equipped with suspended basic ends. An increasing number of furnaces are provided with 2-pass checkers.

An increase in the use of high-grade lump foreign ores for charge and feed ore was noted in the past year. The practice is reported to increase steel production. On the safety side of the picture, jet tapping of heats continues to spread to more open-hearth shops, and a number of companies are experimenting with "auto pour" method for teeming molten steel from ladles.

Size vs. Cost—A study of the comparative capital investment cost of various steelmaking processes emphasizes the steady decrease in capital costs per unit capacity with increased plant size. For instance, the unit cost of a 1 million-ton bessemer plant is one-third that of a small 100,000-ton meltshop. While the decrease in unit costs in the case of open hearths and electric furnaces is relatively less, it is nevertheless substantial.

Naturally, there are limiting factors in this equation. While the trend has been towards larger open-hearth furnaces in integrated plants, excessive capital costs for large steel girders and columns, and for large ladle cranes, as well as massive foundations, have stabilized the maximum size at about 275 net tons.

Arc Furnaces, Too—This same trend holds true in the design of ingot steel melting electric arc furnaces. The latest installation has a 24-foot diameter shell, and has a transformer of 30,000 kva capacity. Removable roofs for top charging large electric melt furnaces have reduced the charging time from hours to less than five minutes.

These combined improvements make it possible for such furnaces melting 100 tons of cold charge to equal the hourly production of open-hearth furnaces having capacities of 200 tons or more, and using 50 per cent hot metal, or more. Three electrodes are used and both power and electrode consumption are said to be good.

Induction Stirrers—Electric furnace operators are watching with great interest what is believed to be the largest induction stirring installation in the world. It went into operation on a new 90-ton furnace and accomplishes at the touch of a button what previously required a series of inefficient manual operations.

The need for some better method has long been recognized by all operators and metallurgists. The induction stirrer, of Swedish origin, has been proved in practice on small European furnaces. Control of metal in the molten state is vastly improved which results in a metallurgically better product with greater economy.

Less Bessemer—Within the last year a number of the large producers of acid bessemer steels have dismantled their bessemer converters and are producing steel equivalent to bessemer screw stock in both the basic open hearth and basic electric furnaces. This is not a new venture, but the large production of such steel has been recognized by the American Iron & Steel Institute which has assigned grade numbers corresponding to the existing acid bessemer designations. Thus C1211 is now equivalent to B1211, C1212 to B1212, etc.

These 1200 steels are accordingly produced by rephosphorizing, resulphurizing and renitrogenizing so that they will exhibit the same machining characteristics as the acid bessemer product. In a number of instances, superior machinability is reported.

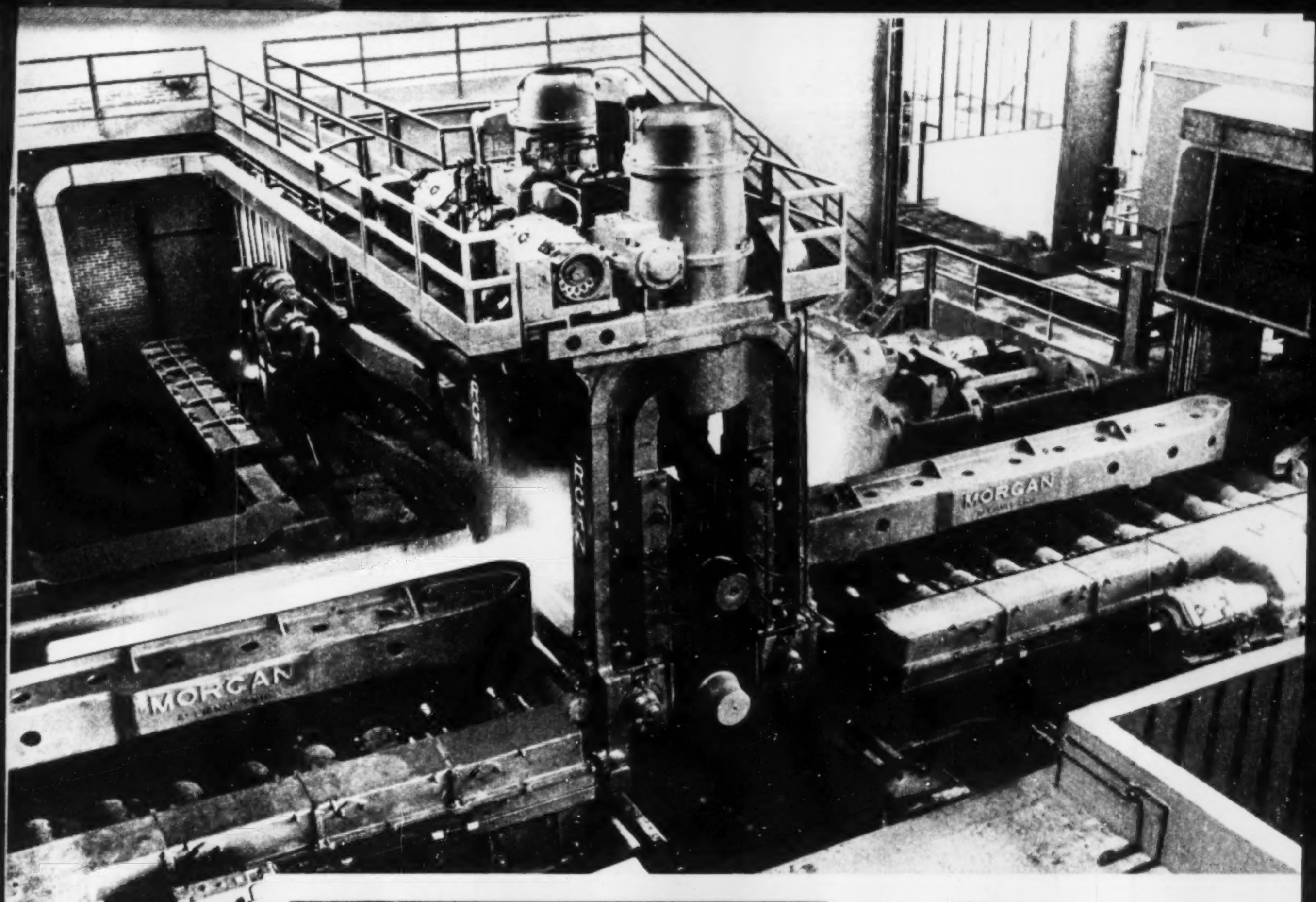
Bessemer Oxygen Blast—Good results continue to be reported on the use of oxygen for Bessemer blowing. One company using 24.7 per cent oxygen blast air for 3 to 4 minutes during the silicon blow was able to decrease blowing time about 30 per cent and the tons of blown metal produced per minute increased about 40 per cent.

Commercial continuous casting took its important first step last year with the ordering of the first unit for installation in a Canadian mill

Scrap melting capacity was increased from an average of 12 per cent on straight air blast to 20 per cent on oxygen-enriched blast, while nitrogen absorption was decreased. This plant has recently been equipped for routine operation on oxygenated blast, and it has its own 400 ton-per-day oxygen generator to supply the needs.

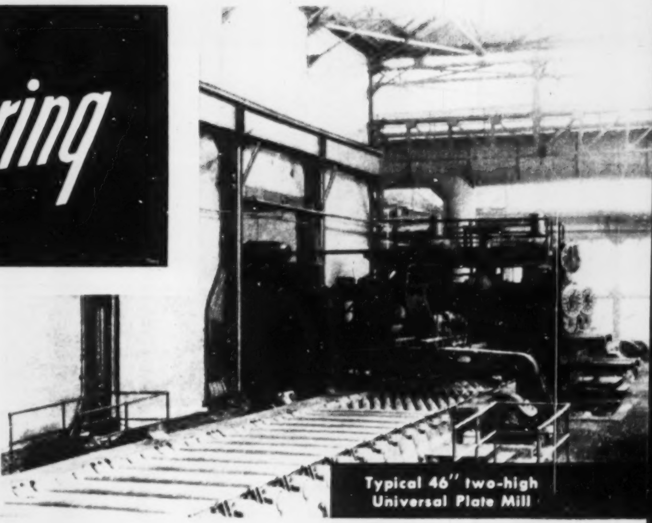
Refractories Picture—Completion of a number of manufacturing units in 1952, and the additional construction planned for this year will all but eliminate the shortages of refractory material. Shortages in some of the high alumina raw materials are likewise being overcome and the supply should become normal in 1953.

Savings in production costs realized through high operating rates focus more attention on the problem of uniform service life for all parts of the furnace. Under such operation more different kinds of refractories are used in each furnace, special kinds being selected to boost the life at spots

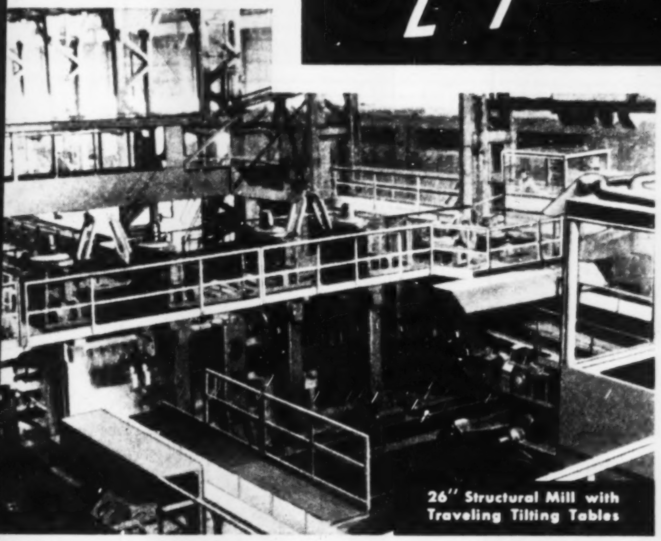


A Modern 40" two-high Blooming Mill with Twin Motor Drive

BUILT BY MORGAN Engineering



Typical 46" two-high Universal Plate Mill



26" Structural Mill with Traveling Tilting Tables

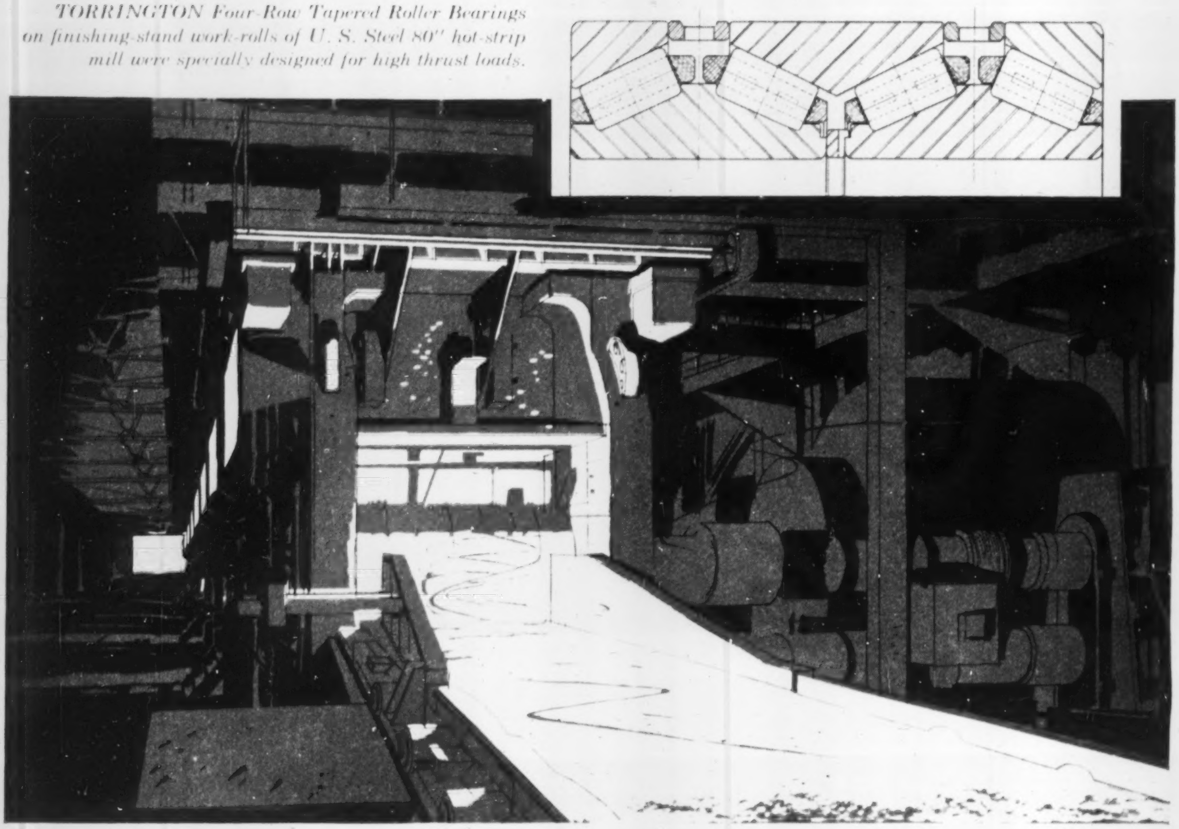
MILL BUILDERS AS WELL AS CRANE BUILDERS

● For over a half century The Morgan Engineering Co. has designed and built heavy duty Mills and their Auxiliary Equipment for the steel industry in many parts of the world. Pictured here are a few typical Morgan installations in use. *Your inquiries will be appreciated. Ask for Bulletin No. 16-A.*

DESIGNERS • MANUFACTURERS • CONTRACTORS • BLOOMING MILLS • PLATE MILLS • STRUCTURAL MILLS • ELECTRIC TRAVELING CRANES • CHARGING MACHINES • INGOT STRIPPING MACHINES • SOAKING PIT CRANES • ELECTRIC WELDED FABRICATION • LADLE CRANES • STEAM HAMMERS • STEAM HYDRAULIC FORGING PRESSES • SPECIAL MACHINERY FOR STEEL MILLS

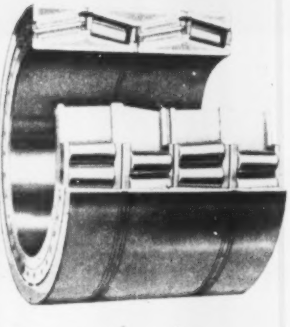
THE MORGAN ENGINEERING CO. ALLIANCE, OHIO · Pittsburgh, 1420 Oliver Building

TORRINGTON BEARINGS AT WORK ...



TORRINGTON Four-Row Tapered Roller Bearings on finishing-stand work-rolls of U. S. Steel 80″ hot-strip mill were specially designed for high thrust loads.

Rolling to a new world's record!



2,621,500 net tons of 2000-foot coils of uniform strip! That was the world's record rolled in 1951 by U. S. Steel's 80″ hot-strip mill—on TORRINGTON Tapered Roller Bearings.

Precision-ground TORRINGTON Tapered Roller Bearings are used on many of the work-roll and back-up thrust positions, from the huge mill's No. 1 scale breaker to its finishing stands.

These TORRINGTON Bearings, say U. S. Steel engineers, have given excellent service. Specially designed by TORRINGTON to withstand the high thrust loads developed, they have helped to cut down-time to only one hour a turn.

Get more tons per turn from *your* mills. Equip them with TORRINGTON Tapered Roller Bearings.

THE TORRINGTON COMPANY

South Bend 21, Ind. Torrington, Conn.

TORRINGTON *TAPERED ROLLER* **BEARINGS**

Spherical Roller • Needle • Tapered Roller • Straight Roller • Ball • Needle Rollers

of most severe wear.

New Products—Among the new products introduced in 1952 is a clay-graphite brick possessing unusual resistance to certain types of slag attack. Significant also, was the development and introduction of a chrome-magnesite gun refractory for maintenance of metallurgical furnaces. Composition of this refractory is similar to that of the basic brick used most widely in furnace construction.

The ease and effectiveness with which this new product is pneumatically emplaced and the excellent refractory properties of the material attract support from operators once skeptical of the merits of this form of maintenance practice. These refractories are also finding greater use in the gray-iron and nonferrous smelting industries.

Tough Stack Mortar — In the field of blast furnace refractories, use of hard burned high-duty and superduty fireclay brick has greatly minimized carbon disintegration within the brick. The fact that carbon might deposit within the mortar joints had been almost completely overlooked.

Development of a CO resistant mortar which actually contributes to the immunity of the brick to disintegration may be the answer to this problem. Test samples were subjected to an atmosphere of 99 per cent CO for 24 hours at 910 F, and the treated mortar resisted attack as can be seen in an accompanying photograph. Both mortars were identical except for the addition of the immunizing agent in one sample.

Plastics and Castables—The year has seen an increased use of plastic refractories and castable refractories. The shortage of skilled masonry labor and the necessity for reducing repair time have been the deciding factors in this increased use.

Service results now show that many installations have improved furnace design and operation due to the flexibility of construction of these products. The industry is certain to see much greater activity in these fields this year.

Old Problems . . New Solutions—Increased steel tonnages and

A two-finger tapper . . .
but he knows his wheel types!

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To Simonds Abrasive Co.
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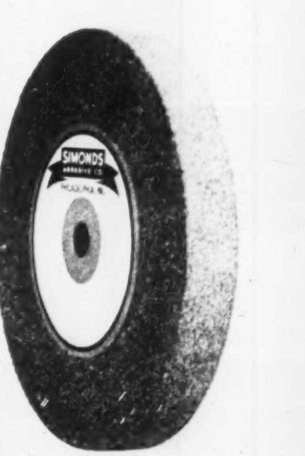
You'll find our free data book mighty helpful. It gives wheel recommendations, lists specifications and suggests methods for safe, productive grinding. We'll gladly send it, together with name of your Simonds distributor. He can save you time, trouble and money. Write.



SIMONDS ABRASIVE CO., PHILADELPHIA 37, PA. BRANCH WAREHOUSES: CHICAGO, DETROIT, BOSTON
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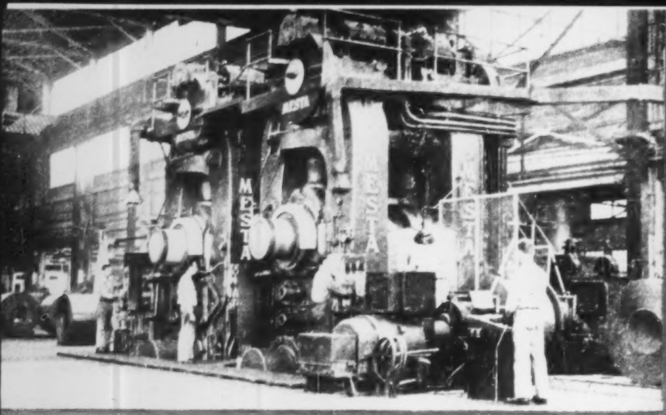
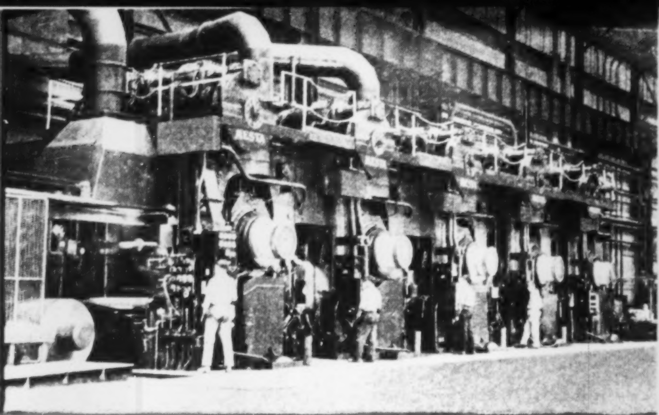
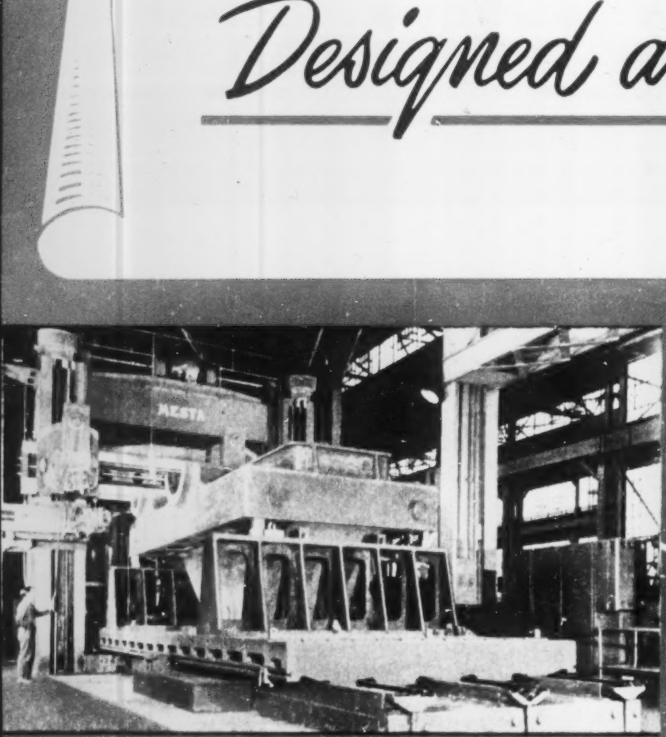
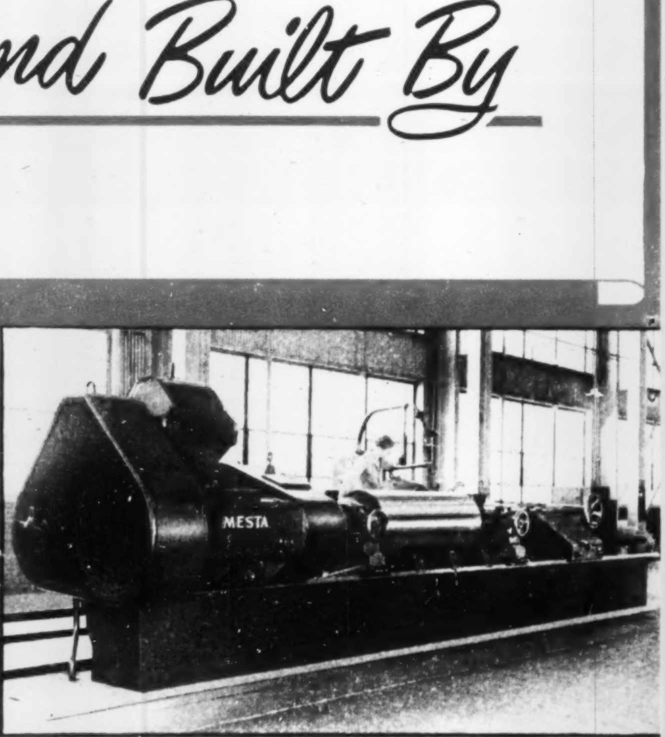
Division of Simonds Saw and Steel Co., Fitchburg, Mass. Other Simonds Companies: Simonds Steel Mills, Lockport, N. Y., Simonds Canada Saw Co., Ltd., Montreal, Que. and Simonds Canada Abrasive Co., Ltd., Arvida, Que.

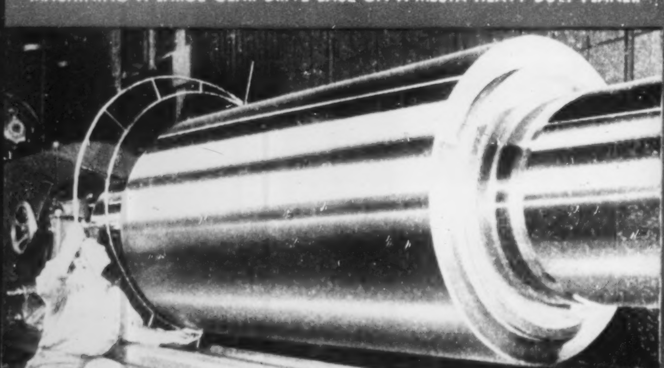

MESTA 42" FOUR-HIGH TWIN-STAND HIGH-SPEED SKIN PASS MILL


MESTA 56" FOUR-HIGH, FIVE-STAND HIGH-SPEED TANDEM COLD MILL

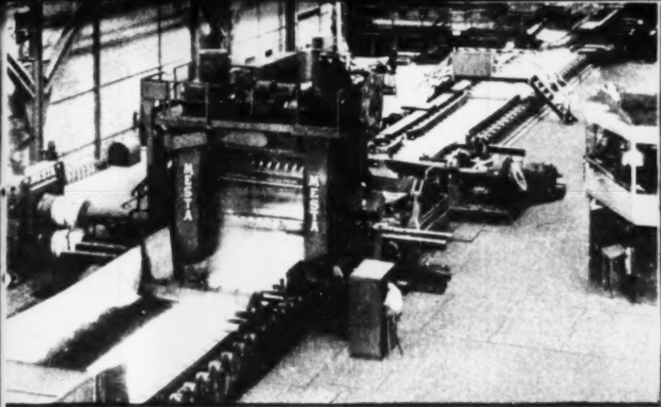
Designed and Built By

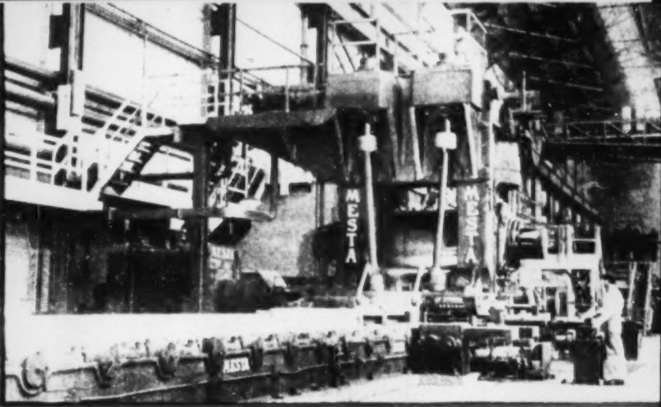

MACHINING A LARGE GEAR DRIVE BASE ON A MESTA HEAVY DUTY PLANER

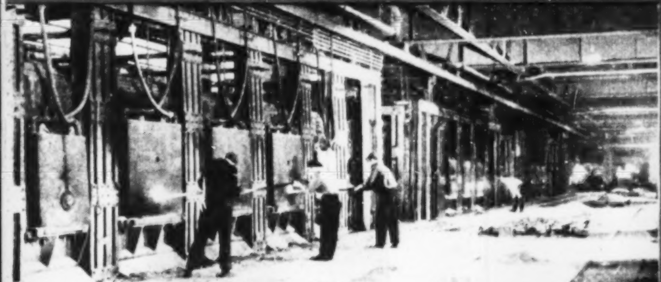

MESTA HEAVY DUTY TRAVELING WHEEL TYPE ROLL GRINDER

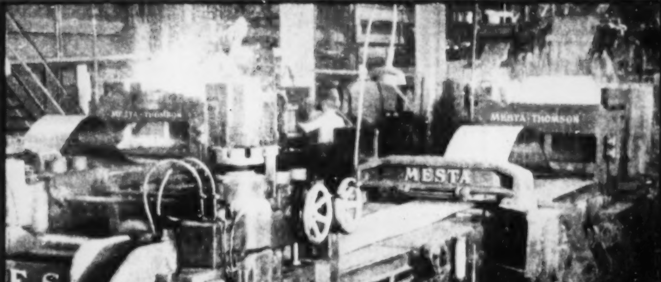

FINISH GRINDING A LARGE MESTA SPECIAL ALLOY CAST STEEL BACKING-UP ROLL IN A MESTA HEAVY DUTY ROLL GRINDER

FOUR MESTA HIGH-SPEED CONTINUOUS PICKLING LINES WITH TRIMMERS, UPCOILERS, AND MESTA-THOMSON FLASH WELDERS


MESTA 110" FOUR-HIGH REVERSING PLATE MILL


MESTA 68" FOUR-HIGH CONTINUOUS HOT STRIP MILL, UNIVERSAL STAND

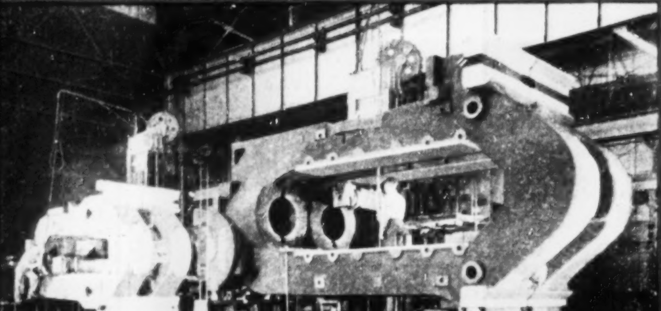

WORKING A HEAT OF HIGH QUALITY STEEL IN THE MESTA OPEN HEARTH DEPARTMENT

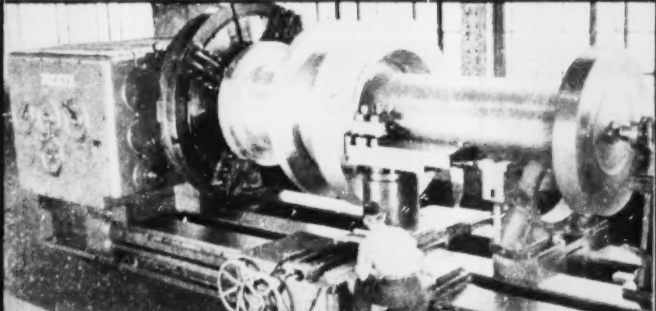

MESTA-THOMSON FLASH WELDERS LOCATED AT THE ENTRY END OF TWO MESTA CONTINUOUS PICKLING LINES

MESTA

MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA


SIMULTANEOUSLY MACHINING ROLLING MILL HOUSINGS IN PAIRS ON MESTA HEAVY DUTY DRAW-CUT SHAPERS


TURNING A MASSIVE ROTOR SHAFT FORGED FROM INGOT POURED IN THE MESTA OPEN HEARTH DEPARTMENT

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Paintstiks!
A COMPLETE LINE
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all Types of Surfaces
HOT—COLD—DRY—WET
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metal . . . glass . . . plastic
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MARKAL PAINT STICK
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You name the material, the surfaces and the conditions under which they are to be marked and you'll find a Markal Paintstik that will efficiently do the job. In those rare cases where conditions are out of the ordinary and no stock Paintstik is available, one will be developed to meet your needs.

Markal Paintstiks are a quality product that produce permanent markings—made especially to meet the needs and special conditions of industry.

Write today for an easy selector chart, then order Paintstiks from your nearest jobber. If he should not have them write direct to the address below.

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MARKAL PAINTSTIKS

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savings in maintenance costs realized by the use of high MgO bottoms—particularly in the first three to five years—led many operators to the next logical step for maximum utilization of the improved bottom materials, namely a planned bottom replacement program. This is based on the belief that on a year-to-year basis they will produce more steel more cheaply than by the old method of "riding the horse until it drops."

Methods have been developed whereby bottoms can be installed in appreciably less time, and where the bottom is superior in density, homogeneity, hot strength and all-round durability. Experience developed furnace heat-up methods materially reducing the time required to get a furnace back on the line. Full bottoms are being rammed to operating contour in 10 to 15 hours.

Design Improvements—In an effort to improve combustion, single uptakes are reduced in size by a constriction produced by necking-in certain walls. With this construction, either burned or chemically bonded chrome-magnesite brick are being installed in the fantail nose and chill walls, with the burned brick generally preferred.

To solve the old problem of damaging frontwalls with the charging machine, a renewed interest is reported in flared jambs tapering inwardly. Many openhearth shops are using this practice and finding metal encased chemically bonded magnesite-chrome refractories satisfactory.

Continuous Casting—Large reduction in blooming mill investment as well as real saving in mold costs strongly recommend the continuous casting process for small mills operated in consuming centers rather than producing centers. Enough progress has been made to encourage the necessary high pressure work and investment required to make the process a success in electric furnace tonnage plants.

Many problems are yet to be worked out to the complete satisfaction of the users and the equipment builders. It would seem that its success is directly connected to

Exide-Ironclad
BATTERIES

ARE YOUR BEST POWER BUY— AT ANY PRICE

They Assure high maneuverability of trucks . . . rapid, accurate handling of material. Provide uniform rate of material handling with no unscheduled down time. Show lowest costs of operation, maintenance, repair, depreciation . . . inherently safe. For all types, sizes, makes of battery-electric trucks—hand or rider. Call in an Exide representative, and let him prove these facts.

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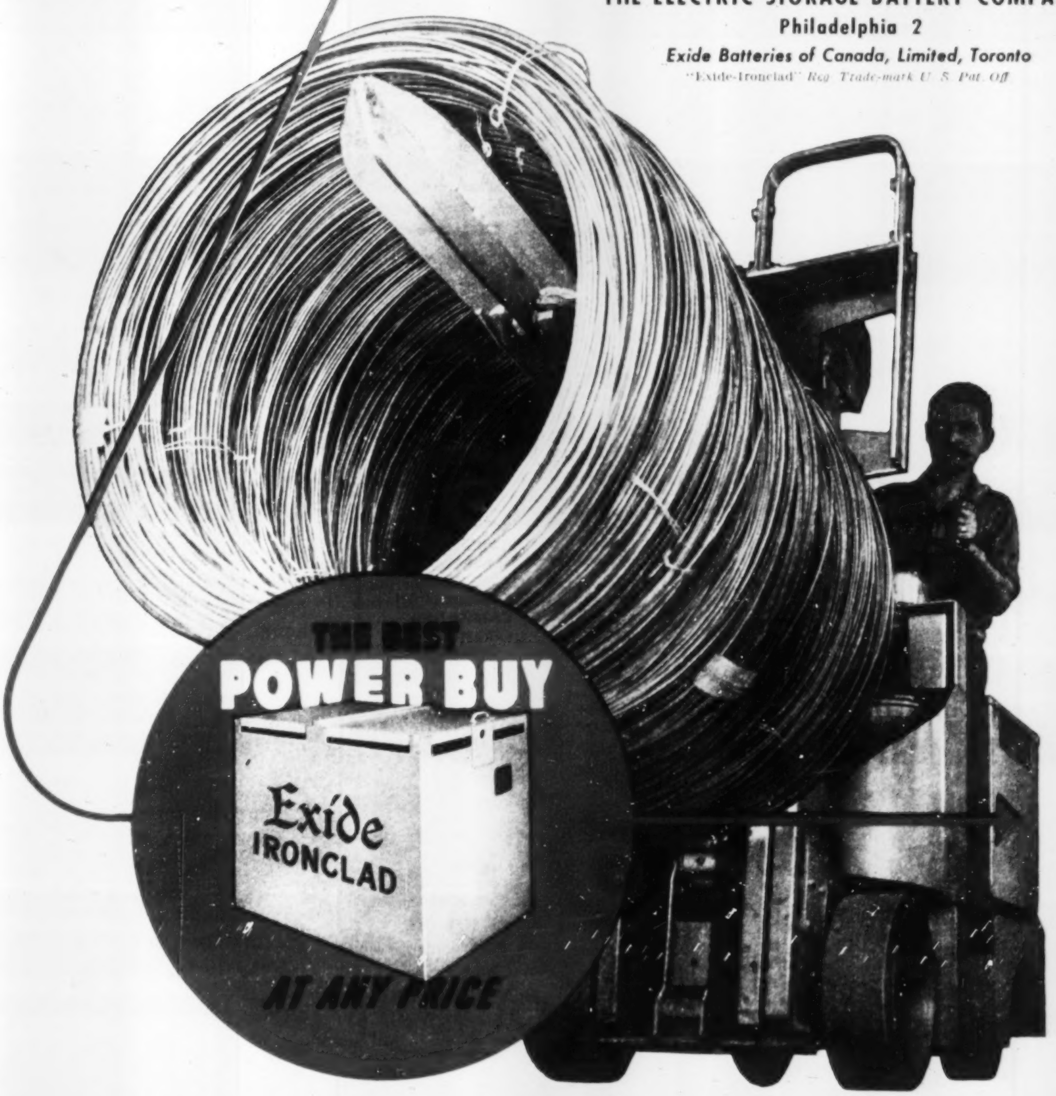

Why Lift Extra Tonnage?

O.S. WALKER CO.
INC.
WORCESTER MASS

Walker Lifting Magnet operates with valuable saving of electrical energy . . . high ratio lifting magnet gives maximum lifting with minimum weight. Walker's advanced design insures more payload per lift . . . gets into corners . . . reduces supplementary hand work.

LESS WEIGHT — MORE POWER!

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GAS-FIRED
OIL-FIRED
and ELECTRIC
FURNACES
for

- AGING
- ANNEALING
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A SIZE AND TYPE OF FURNACE FOR EVERY PROCESS PRODUCT OR PRODUCTION

BRIGHT ANNEALING AND NORMALIZING STEEL STRIP *Continuously*

● EF continuous annealing and normalizing furnaces subject the entire length of the coil to exactly the same time and temperature cycle, producing extreme uniformity of grain size, resulting in superior qualities for deep drawing.

These furnaces shorten the annealing and normalizing cycle — and reduce the tonnage of material in process. Tension on the strip, the speed of travel and the atmosphere in the furnace are accurately controlled, producing the exactly desired surface finish and physicals — day after day. Capacities to meet any requirement.

THE ELECTRIC FURNACE CO.
GAS FIRED, OIL FIRED AND ELECTRIC FURNACES
Salem - Ohio

Canadian Associates ● CANEFCO LIMITED ● Toronto 1, Canada

a ladle and pouring practice which permits a close control of both pouring temperature and rate of flow, and hence involves heated pouring heads and heated mechanically operated secondary pouring ladles which pour "over the lip."

Strip Steel Rolling—A possible significant trend in the rolling mill field is the increase in the number of recent mills rolling strip steel direct from ingots, at least in widths up to 48 inches. If product quality proves satisfactory in practice, it may foreshadow elimination of the customary slab yard and re-heating furnaces in the future.

Soon to go into operation is the world's fastest cold strip mill, designed to roll tin plate material 30 inches wide up to 7000 fpm, or almost 80 mph. The five-stand mill employs six drives ranging from 1400 to 6000 hp, the final stand being driven by a twin-drive unit utilizing six armatures.

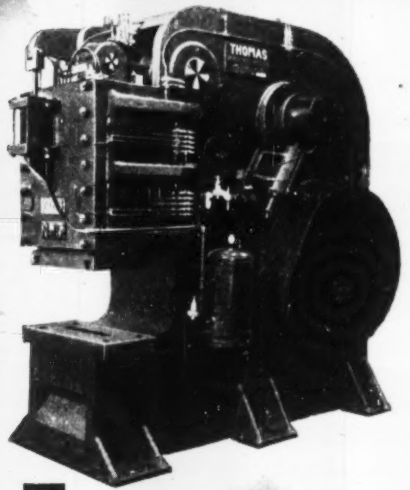
Annealing Furnaces—The last year saw the introduction to the steel industry of the single stack, portable base annealing furnace, long popular in the narrow strip industry. Advantages are speed, uniformity, high load ratios, flexibility, quick and low cost maintenance of the portable base and low cost per ton in process, as compared to multiple stack furnaces.

Of interest in the annealing field is the utilization of by-product nitrogen from oxygen generators for bright annealing. One plant is now drawing over 80,000 cu ft per hour for this purpose.

Special Steels — Significant recent development is the construction of a plant for producing ground and tempered steels required for the production of wide band saws, resaws and precision ground and tempered spring steels. The operation will embrace gages of 0.042-inch up to and including 0.127-inch, widths from 2 up to and including 16¼ inches, and lengths from 24 to 65 feet. Both edges will be ground and the steel tempered to Rockwell hardness of C42-45. Widths of 6 inches or more were previously supplied entirely from Sweden.

...for top-production steel fabricating

1



2

. . . the trend is to Thomas! Steel fabricators, shipyards, railroad car shops and steel mills look to Thomas for everyday dependability and ultimate economy in punching, spacing, shearing and bending machinery. Available in various sizes and tonnages to meet individual requirements. Illustrations show:

(1) *Beam Punch and Motorized Indicator Spacing Table for beam, angle, channel and cover plate punching without layout*

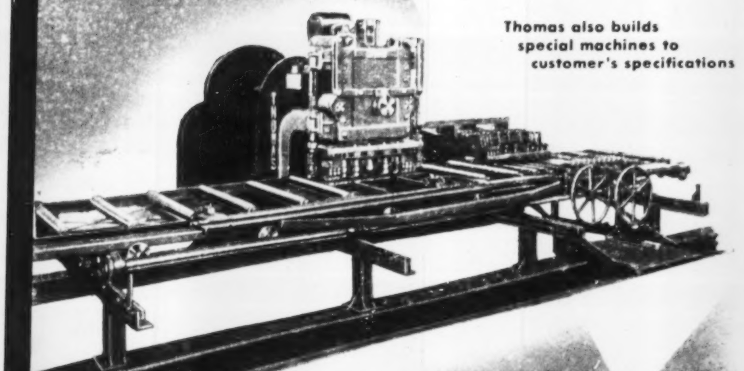
(2) *All-Steel Vertical Punch or Shear for heavy-duty work*

(3) *Plate Duplicator for rapid, economical plate punching*

(4) *Heavy-Duty Mill Type Plate Shear, capacity 1¼″ by 6′ stainless 120,000 psi*

THE TREND IS TO THOMAS

Thomas also builds special machines to customer's specifications



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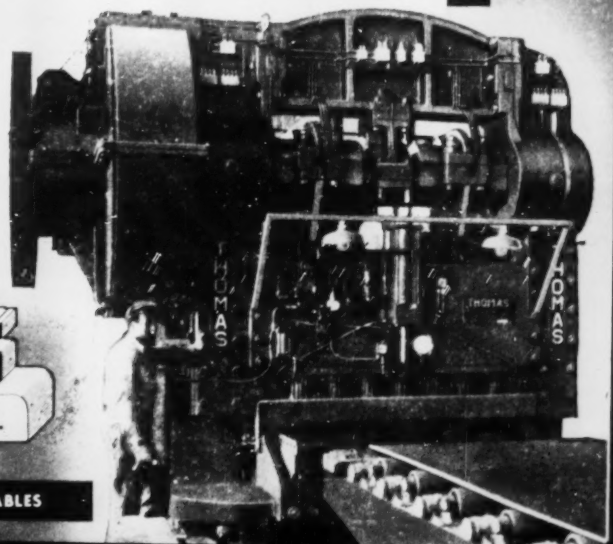
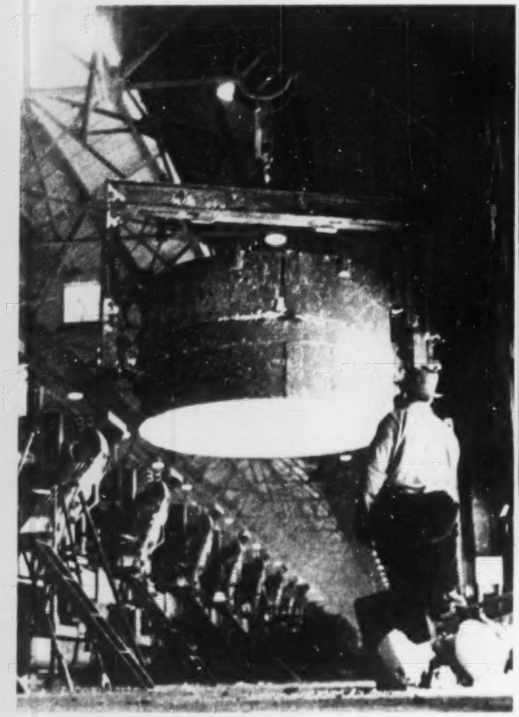


THOMAS

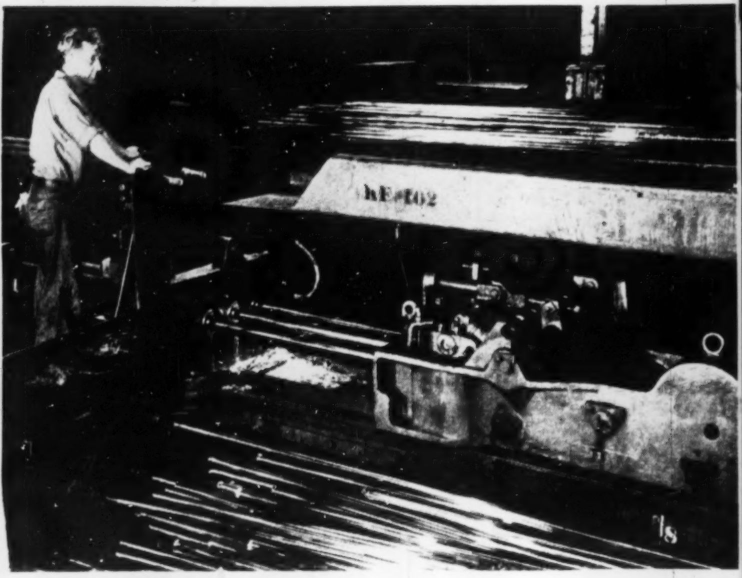
MACHINE MANUFACTURING CO.

PITTSBURGH 23, PA.

PUNCHES · SHEARS · PRESSES · BENDERS · SPACING TABLES



Kaiser's pot line at Chalmette is typical of the aluminum industry's mushrooming growth



In the copper and brass industry, multi-tube drawbenches boost volume production of longer, heavier tube coils

FORUM ON TECHNICAL PROGRESS

Nonferrous Metals

Defense requirements put pressure on nonferrous metal producers and squeeze on consumers. Outlook for 1953 is for greater production. Improved processes make available more sources for ore

MUSHROOMING productive capacity, new metals, amazing processes and equally amazing applications fill the nonferrous metal industry with youthful optimism for the future.

Once considered only for special applications—electrical, corrosive or decorative—quantity production and new fabrication methods are putting the nonferrous metals, especially aluminum and magnesium, within the reach of many more users.

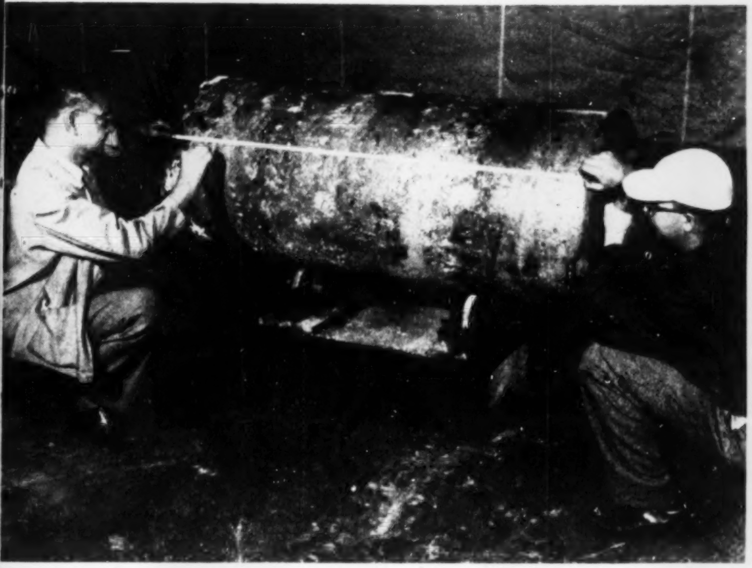
Copper Tonnage Tops — Oldest of the nonferrous metals, copper continues as the production leader. The 1.25 million tons estimated primary and secondary production for last year edges the aluminum tonnage by an ever-narrowing margin. Quality of ores continues to slip, and only concerted efforts to improve milling and smelting operations have enabled producers to maintain current price levels.

Most pleasing development comes from reports of copper producers that increased supplies can be expected during the next two years. Some continuous casting is being done, both billet and flatmetal, with one producer scheduled to introduce 3000-pound, nonwelded coils of 24-inch strip.

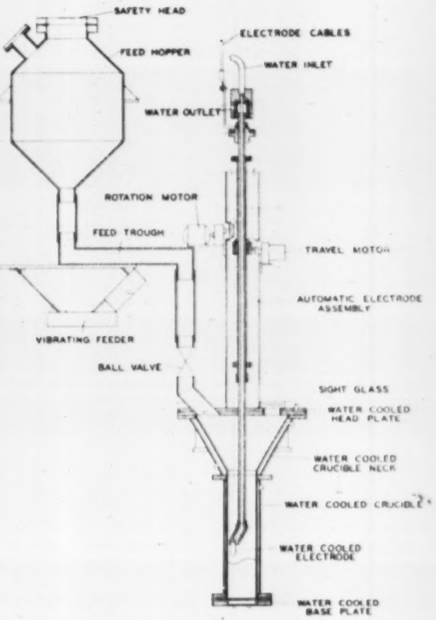
Bigger Cakes—In alloy casting the trend continues toward larger furnaces, 3000, 4000 and 5000 pound capacity, with an input of 350 kw. From these furnaces are poured brass cakes weighing up to 3300 pounds and brass extrusion billets weighing 1500 pounds.

Use of statistical controls on many operations is helping to provide uniform and improved quality. The first installation of direct reading spectrometers for analytical controls have proved successful.

Stress Volume Production—Trend throughout the fabricating industry is away from job-shop production and towards big volume



Titanium ingot casting reached a new high when RemCru produced this 2-ton giant by its arc casting method



Republic is producing low-carbon titanium with this system of water-cooled sponge arc melting

output. Interest in machines that continuously draw, cut to length and polish brass rods is mounting. In tube manufacture, many long-length triple drawbenches are installed. Block drawing of small diameter tubes is producing coils several times heavier than were previously available.

Sendzimir mills are being installed to offer exceptionally uniform gage strip in the thinner gage ranges. Existing 4-high mills are being equipped with special gages to improve uniformity.

Welding processes, principally shielded arc on strip and resistance methods on rods, are being improved so that industry can offer longer strip and coiled wire for increased machine efficiency.

Aluminum Picture Bright—Best estimates of 1952 aluminum primary and secondary production put the figure at better than a million tons, and with more productive capacity going to work this year, the industry expects to exceed its best wartime production of 1,234,000 short tons by better than 200,000 tons. With the scrap expected back on the market this year, this country will have an aluminum supply of 2 million tons.

An indication of how widespread aluminum applications have become is the list of CMP allotments issued each quarter.

Plenty of Resources — Limited supplies of high grade bauxite in Arkansas pose no great problem to the industry, since plentiful supplies exist in the Caribbean area not far away. On the island of Jamaica alone, there is probably enough to meet the needs into the next century. In Dutch and British Guiana there are also substantial deposits and likewise the island of Haiti.

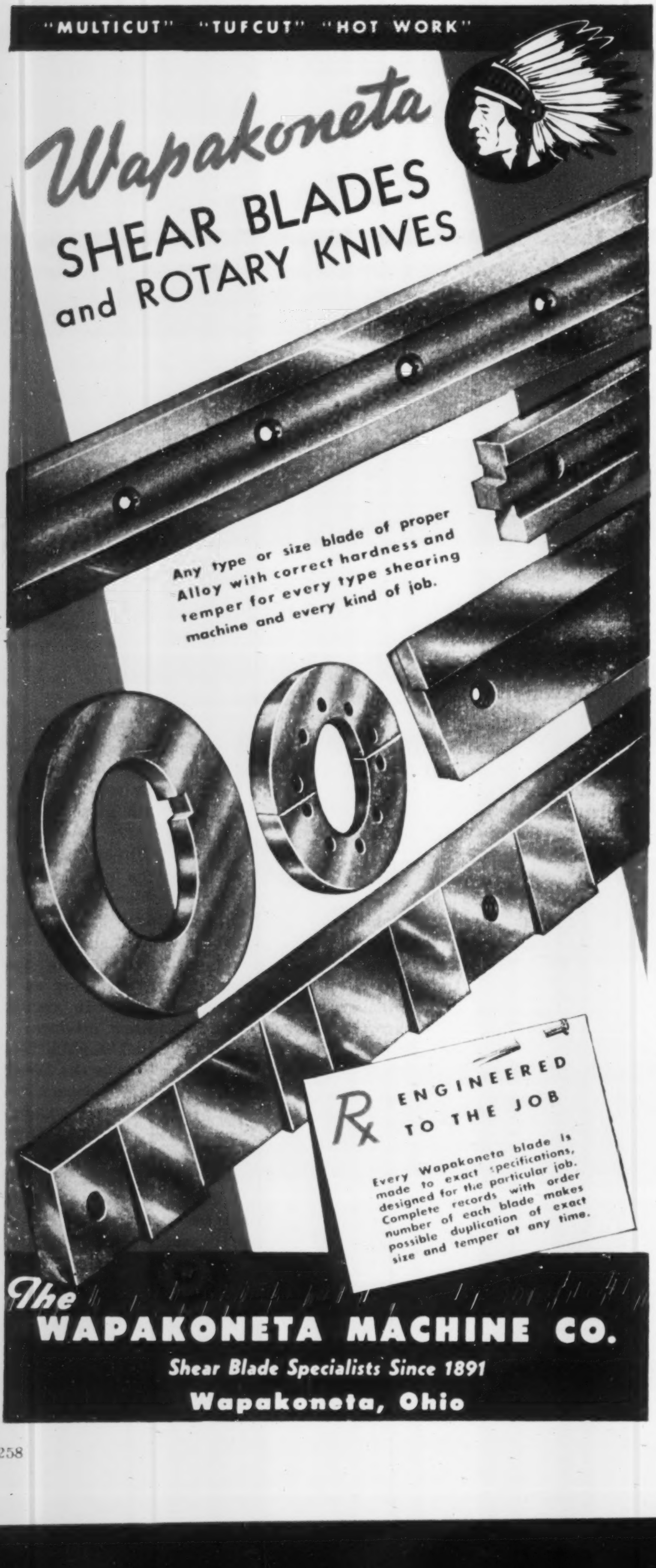
There are vast quantities of low-grade deposits just waiting for a process which will make them commercially useable. But the industry is so rich in its basic ore that up to this time there has been little impetus given to research on the poorer ores.

Less Hydro Power—Until World War II, only hydroelectric power was used in this hemisphere for production of basic aluminum. Coal and natural gas as a power source is becoming the trend, with about 70 per cent of all new capacity since Korea using this form of energy. Most of this capacity is located in the South close to fuel supplies.

Continuous vs. Direct Chill Casting—Results of the evaluation of relative merits of continuous and direct chill casting are still insufficient to draw a conclusion. Direct chill multiple casting machines are pouring as many as 14 ingots simultaneously in regular production. Another producer is pouring 1000-pound ingots from a giant new pot line in the South.

As part of the government's heavy press program, one aluminum producer successfully cast 32-inch diameter, 75S ingots from a continuous machine. Though the machine used was an experimental unit, the basic information gathered in the casting of more than 50,000 pounds of large cross section ingots will simplify the task of designing production equipment.

The Magnesium Paradox—Unlike many industries which are able to retain a substantial share of their civilian business during an emergency period, magnesium pro-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SHEAR BLADES and ROTARY KNIVES

Any type or size blade of proper Alloy with correct hardness and temper for every type shearing machine and every kind of job.

Rx ENGINEERED TO THE JOB

Every Wapakoneta blade is made to exact specifications, designed for the particular job. Complete records with order number of each blade makes possible duplication of exact size and temper at any time.

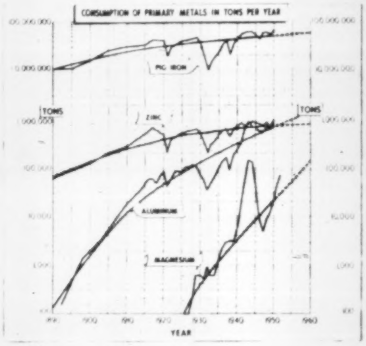
The WAPAKONETA MACHINE CO.

Shear Blade Specialists Since 1891

Wapakoneta, Ohio

duction has been largely channeled to military use. Since the Korean conflict, additional magnesium plants, closed since the war, were reopened until present day yearly production capacity is in the neighborhood of 100,000 tons. Of this, 45,000 is consumed and 55,000 stockpiled by the government.

Once again, civilian customers were cut off just as new uses for the metal evolved. Consequently, design and fabrication developments are again retarded. In spite of these handicaps, fabricators are going ahead with plans for greater use in the future.

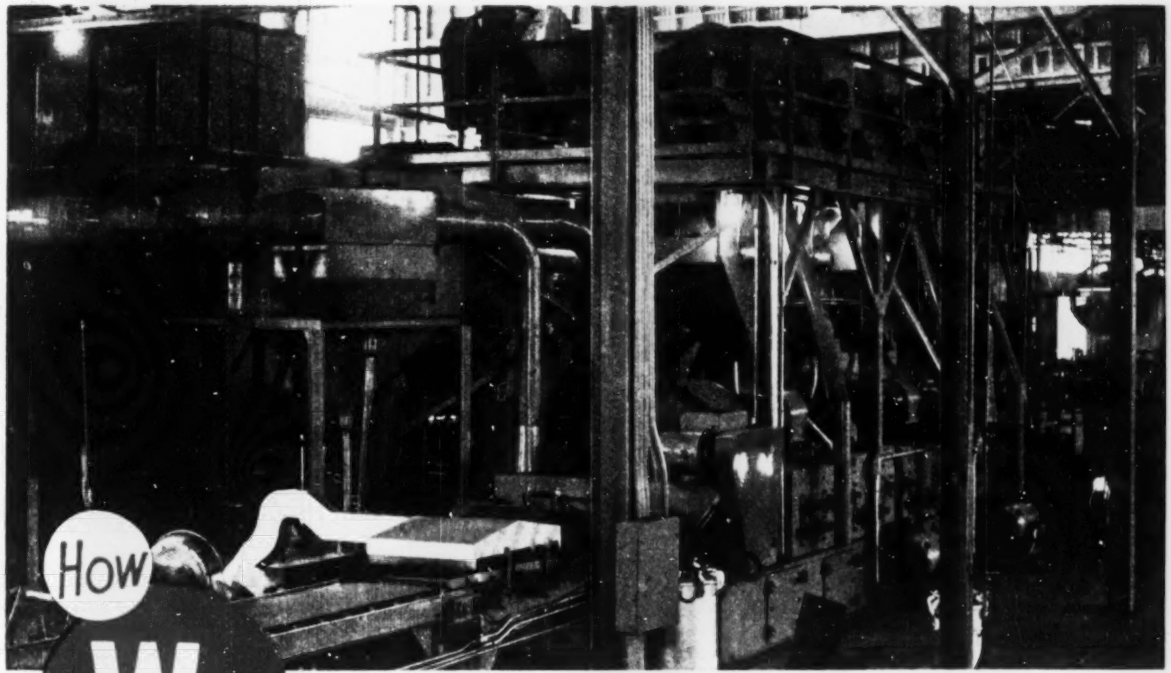


Projecting the average growth rate of magnesium experts predict that by 1960, 300 million pounds of the metal will be consumed annually

Potential Gold Mine — Perhaps the greatest potential user of magnesium is the automobile industry. A nominal application of say, 30 pounds, would require 125,000 tons of the metal per normal producing year. Some of the applications in production, or that have been production-tested, include clutch housings, torque converter housings, oil seal plates, transmission parts, convertible folding top pillars, generator end plates, etc.

Glamor Metal—Small scale commercial production of titanium is under way, and even at this early stage it is assuming a prominent position and can no longer be categorized as a rare metal. Light, strong, durable and corrosion resistant, it boasts one other important qualification ores are plentiful.

Present daily production is about 5 tons and is expected to reach 51 tons by the end of 1955. This will take huge expansions in



How WHEELABRATOR® MECHANICAL CLEANING of Hot Rolled Steel Sheets

Reduces Cleaning Costs per Ton

Operating results of airless Wheelabrator mechanical cleaning equipment for removing scale from hot rolled steel sheets have proved that other methods do not equal its cost-cutting performance and high speed cleaning efficiency.

In each of the seven drum plants of Rheem Manufacturing Co., for example, Wheelabrator machines have greatly reduced the cost of cleaning 18-gauge steel sheets used in the manufacture of their new Rheemcote lithographed steel drums. In other steel processing plants and steel mills, the Wheelabrator is also effecting impressive results in low cost, high production and providing extra benefits in improved surface cleanliness and better working conditions.

These production economies are a result of perfected equipment design coupled with the controlled abrasive blast of the Wheelabrator unit. With the introduction of American Steel Shot, equipment operating and maintenance costs are extremely low and continuous, high-production mechanical cleaning of hot rolled products is now in actual practice.

We would be glad to demonstrate the savings the Wheelabrator can make for you. Write today for full details and an appointment to see the Wheelabrator in operation.

WHEELABRATOR —The perfected airless centrifugal blast unit pioneered by American slashes cost and cleaning time. Conserves power, labor, space. Cleaning perfection results in longer tool life, faster machining and grinding, easier inspection.

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WORLD'S LARGEST BUILDERS OF AIRLESS BLAST CLEANING EQUIPMENT

WHY NOT
cast a
magnesium
mousetrap?

Maybe it IS a lousy idea . . .

On the other hand, maybe it's as practical as using cheese for bait.

Frankly, we haven't gotten out a slide rule or put our thinking cap on tight, to figure it out one way or the other. Maybe the mice wouldn't go for it.

But we do know a lot of things WILL be cast in magnesium or aluminum after military requirements are satisfied.

A lot of things no one ever thought would be.

So whatever your plans are; whatever directions they might take; whatever products you might have on scraps of paper, in preliminary drawings, or just plain ideas-on-the-brain . . . . keep an open mind in terms of magnesium or aluminum in sand-cast, semi-permanent or permanent mold form.

Particularly Well-Cast castings.

Naturally.

Well-Made Wood and Metal Patterns • Ampco Bronze Castings

Almost a half-century of Experience

THE WELLMAN BRONZE & ALUMINUM CO.

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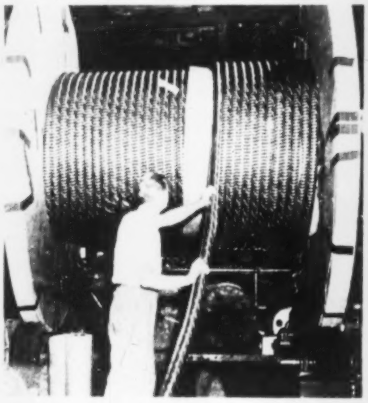
smelting capacities as most furnaces are little more than laboratory size. Interesting problem which presently defies solution is—what to do with scrap titanium. One manufacturer reports that his scrap is merely pushed into a corner and forgotten, there being no known way to economically melt it down.

Basic interest now is to lower the price of the metal. Its corrosion resistance could make it competitive with stainless steel even if the price were considerably higher, since a sheet of titanium would weigh about half as much as a similar sheet of stainless. This could make for an interesting competitive situation.

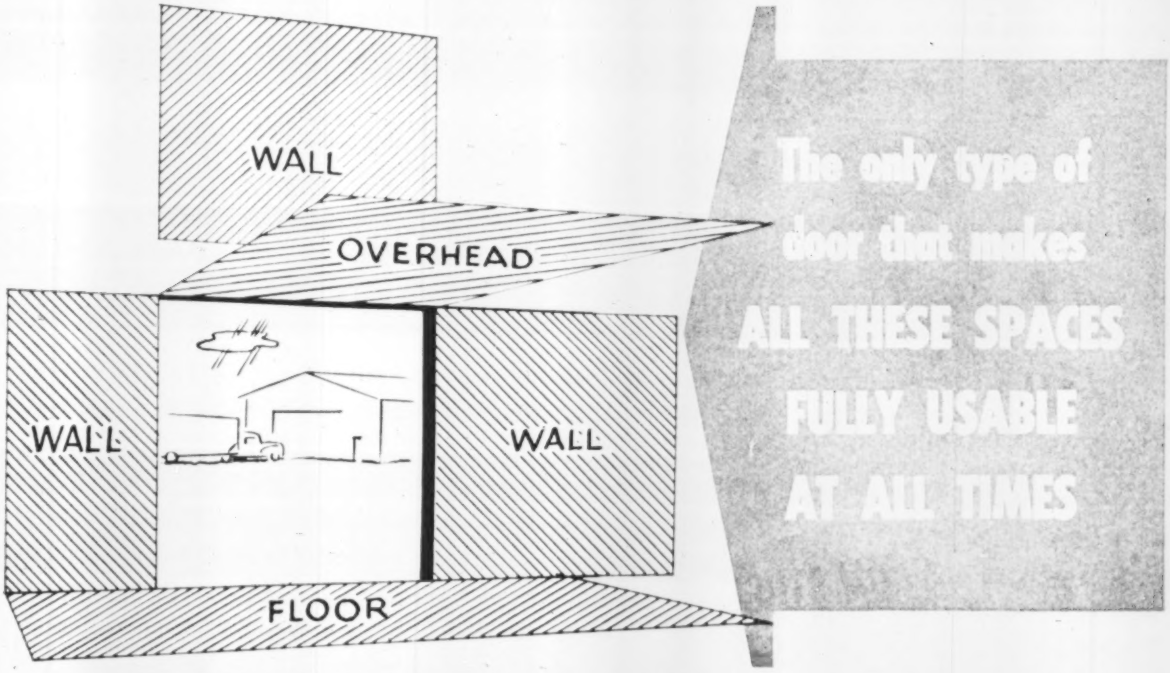


Completed this year was this high-power underwater cable built by Phelps Dodge to carry 27,000 volts under the Hudson River in New York

Present uses are in the form of light, strong sheet or forms for jet engines, aircraft structures, and ordnance components.

Moly Promising — Metallurgists and designers select molybdenum as the most promising refractory metal. Up to now, it has been principally used as an alloying element in steels, but its abundance and high melting point hold high hopes for its use as a structural metal. Ingots are produced either through powder metallurgical means or arc casting.

An interesting recent development is the siliconizing of molybdenum bar, rod, wire, tubing and fabricated parts. The coating not only protects the metal from oxidation in temperatures over


WALL
OVERHEAD
WALL
WALL
FLOOR
The only type of door that makes ALL THESE SPACES FULLY USABLE AT ALL TIMES

KINNEAR Rolling Doors

In addition to many other advantages *proved through more than fifty years of leadership,* you get extra usable space when you install Kinnear Rolling Doors. And with building costs at today's high levels, space economy is more important than ever—whether you need more room now or plan for it tomorrow.

By opening straight upward and coiling into a small space above the lintel, they need no room *inside or outside the building* for opening and closing action.

All ceiling space remains clear for overhead crane or hoist equipment, conveyor lines, ductwork, ceiling-high storage, lighting fixtures or other future needs.

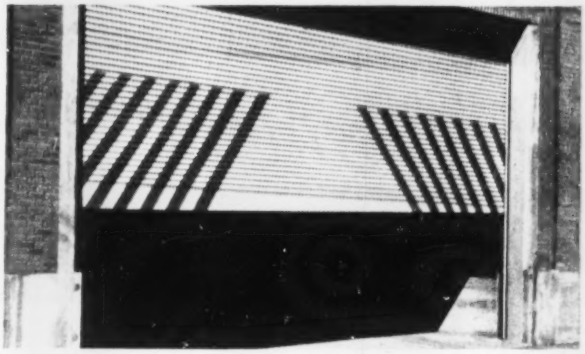
Partitions, storage racks, or other construction can be installed right up to the door jambs on both sides of Kinnear Steel Rolling Doors.

Full benefits of light and visibility are assured at all times, from windows placed close on either side or above Kinnear Rolling Doors. Light from overhead fixtures is never blocked off.

Trucks or other vehicles can stop or park within an inch or two of the door curtain, *inside and outside the building,* without interfering with door operation in any way.

Headroom above Kinnear Rolling Doors need be no greater than the compactly coiled curtain and hood. Or the coil can be mounted on the building exterior where ceiling-high doors are desired.

Other Kinnear *advantages may be even more important in your case. For example:*



Kinnear Rolling Doors clear the entire opening, from jamb to jamb—no projecting edges or mechanism to handicap traffic.

Kinnear's strong, interlocking steel slats give extra protection against fire, theft, intrusion, wind, weather, and accidental damage.

Coiling upward action of Kinnear Rolling Doors is ideal for motor operation, with push-button controls at any desired locations.

The rugged all-metal construction of Kinnear Rolling Doors lasts longer, requires less maintenance, saves money in the long run. If accidentally damaged, slats can be individually replaced *at any time.* Records of 30, 40 and even 50 years of continuous, daily service are reported by many users.

Kinnear Rolling Doors are built any size, for easy installation in old or new buildings. Write today for complete information.

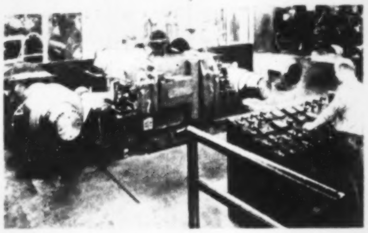
Write for this new Kinnear Catalog today!

The KINNEAR Manufacturing Co.
1780-1800 Fields Ave. 1742 Yosemite Ave.
Columbus 16, Ohio San Francisco 24, Calif.

SAVING WAYS in DOORWAYS
KINNEAR
ROLLING DOORS

1800 F, but allows electrical contact through the coating.

Lead Trends—Most outstanding development in the field of lead extractive metallurgy was the replacement of the old batch softening methods and the Parkes process of refining by a continuous lead softening and de-silverizing process. It was developed by Broken Hill Associated Smelters in Australia.



Sendzimir mills like this one at the Buffalo plant of American Brass roll extremely uniform strip in the thinner gage ranges. Tolerances to plus or minus 0.0005-inch are common

In the field of battery grid metal alloys, the trend toward improving characteristics is continuing. There are several new proprietary alloys on the market which, in most cases, involve the addition of small percentages of copper and silver and occasionally tellurium along with other replacements of antimony.

Zinc in the Clear—The year 1952 opened with foreboding in some quarters that zinc metal would continue in short supply, but as the months passed, it became apparent that the supply would be more than adequate. World zinc ore reserves are now such that there is little likelihood that they will be seriously diminished or exhausted in the foreseeable future.

New techniques and scientific instruments are greatly extending the field of zinc exploration, both here and abroad, and improved practices in the mining, milling and smelting of zinc ores are resulting in greater yield of the contained metal, thus extending available ore reserves.

In view of this current and long-range outlook, it would seem that product designers can work ahead, confident that zinc will be available when needed.

MECHANICAL TUBING

Call Murray's nearest warehouse for seamless cold-drawn mechanical tubing in carbon steel; also for seamless or welded stainless tubing in many analyses; size range . . . 1/8- to 14- inch O. D.

For aid in finding the tubing best suited to your particular need, consult a Murray representative. He may help you uncover new economies in the purchase of mechanical tubing.

WRITE FOR CURRENT STOCK BULLETIN

PROMPT DELIVERY FROM STOCK

A B MURRAY CO INC
ESTABLISHED 1845
ELIZABETH, N. J. McKEESPORT, PA.

Other Murray products include carbon steel tubing and pipe for mechanical and pressure purposes; Welding and screw type pipe and tube fittings. Tube bending, upsetting, swaging.

Since 1916

HYDRAULIC PACKINGS AND MECHANICAL LEATHERS

"V" Leather
Cup Leather
"U" Leather
Flange Leather

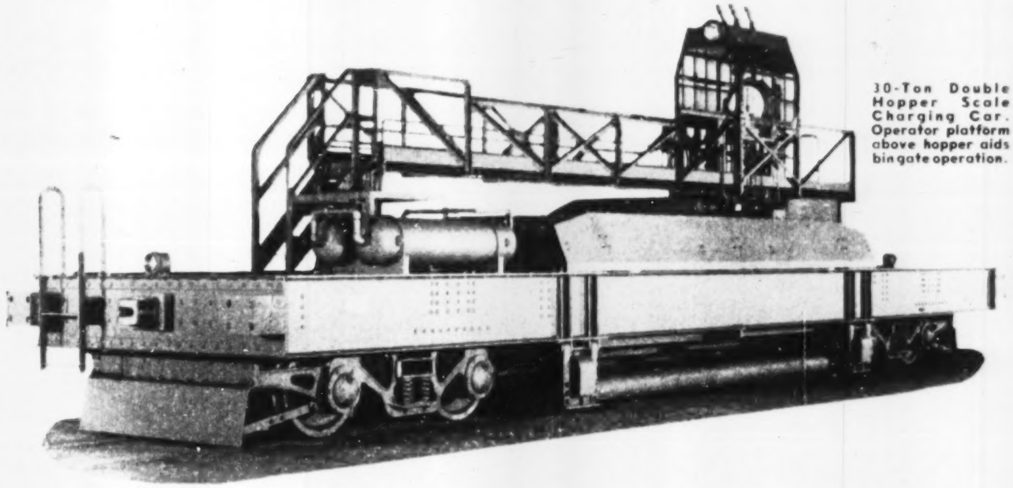
NOTHING TAKES THE PLACE OF Leather!

EXCELSIOR LEATHER WASHER MFG. CO.
ROCKFORD, ILLINOIS

120-Ton Side Dump Ore Transfer

Known for DEPENDABLE SERVICE

More than a half century's experience in producing steel plant cars gives Atlas a fund of engineering knowledge in this highly specialized field. Its value to you is reflected by the ability of Atlas to develop cars that fill the bill for performance, safety, and dependability.

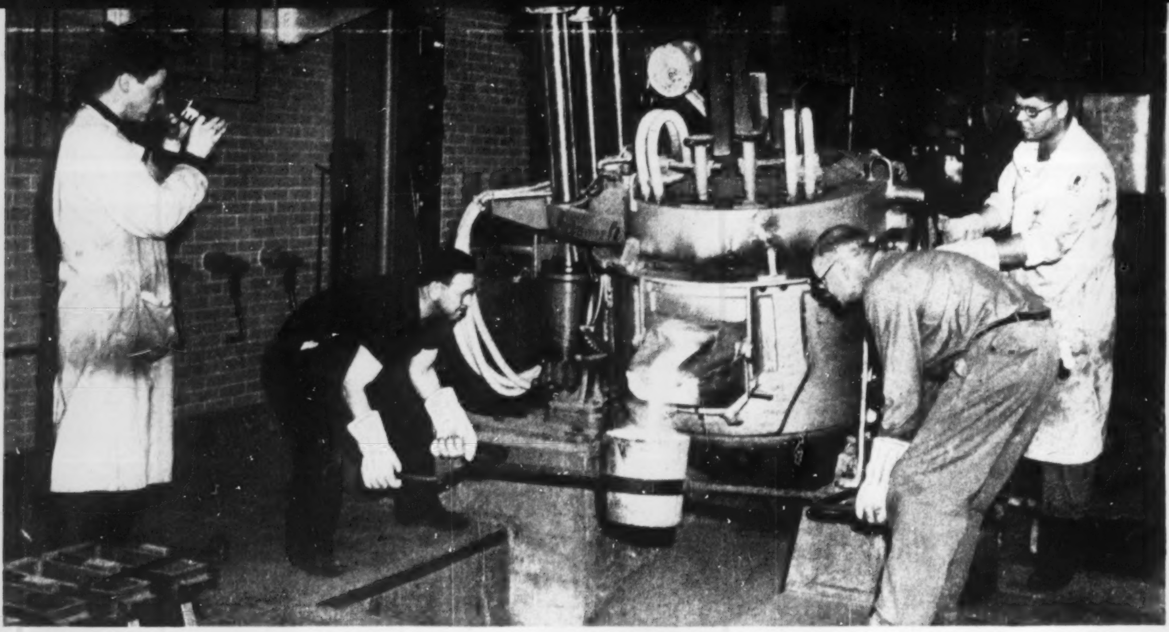


30-Ton Double Hopper Scale Charging Car. Operator platform above hopper aids bin gate operation.

Builders of Scale Charging Cars and Ore Transfers; Indicating and Recording Dials for Weighing Scales; Electric and Storage Battery Locomotives; Coal Charging Cars; Door Extractors; Coke Quenching Cars, and allied equipment

THE ATLAS CAR & MFG. CO.

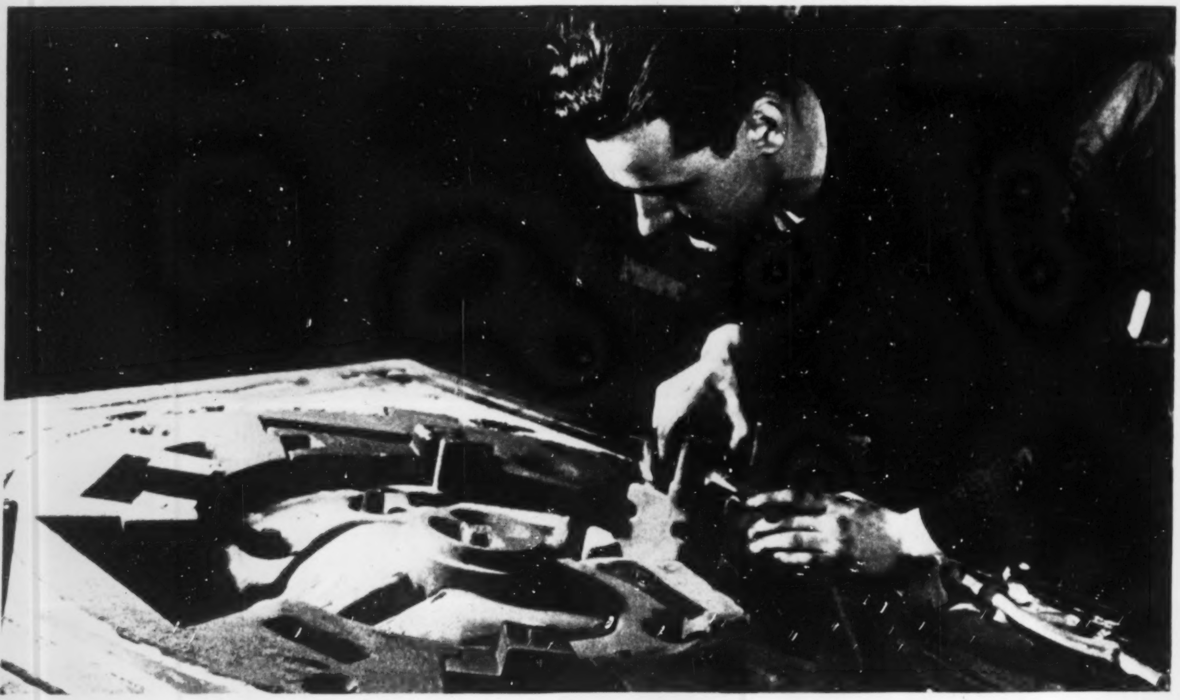
1140 IVANHOE RD
CLEVELAND 10, OHIO, U.S.A.



Pouring a heat from largest furnace in the GM research laboratory. Special exhaust system removes all gases even when furnace is tipped for the pour

FORUM ON TECHNICAL PROGRESS

Casting



Setting cores in green sand mold to produce magnesium alloy sand casting. Defense effort brings renewed interest in lightweight magnesium castings

Foundrymen are finding new ways to make better castings for wider applications at lower costs. Shell molding attracts increasing interest as more improvements in process and machines are made

GRABBING many of the headlines in 1952, shell molding currently claims the position of No. 1 glamour boy in the foundry industry. But others, including gray iron, ductile iron, steel, malleable, precision and die casting can claim their share of the honors too.

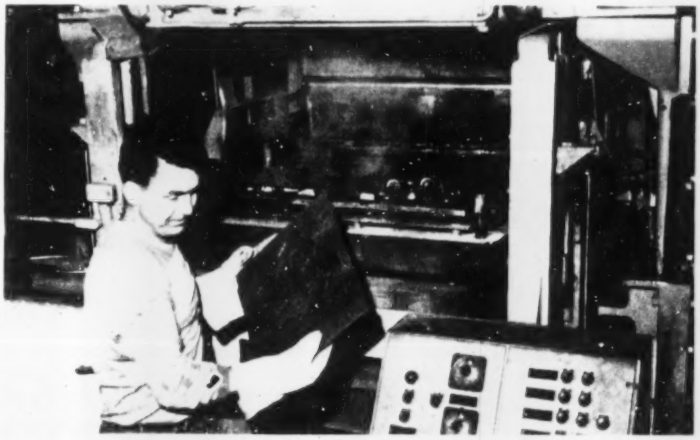
Development work and pilot operations in the larger foundries, both ferrous and nonferrous, are bringing about increasing acceptance of shell molding. An estimated 60 per cent of the foundries employing more than 100 workers are taking an active interest in the process and it is predicted that by the end of this year every large captive foundry will have shell molding on a production basis.

Numerous Advantages — Metal reduction up to 30 per cent per mold, ability to cast to closer tolerances thereby reducing machining requirements, indefinite storage of baked shells without deterioriation due to moisture absorption, reduced floor space requirements and lower scrap losses are favorable factors that will influence continued growth.

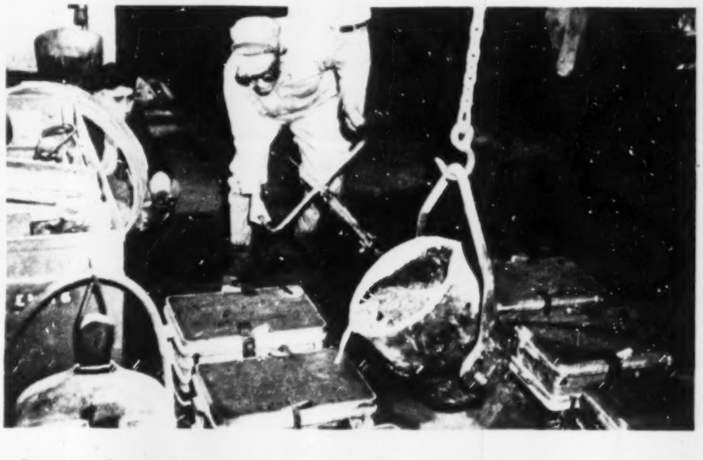
Basically the process utilizes the thermosetting properties of phenolic resins to bond silica grains in the construction of a mold. Resin varies from 5 to 9 per cent by weight of the sand used. The most satisfactory resins for molds are those with low to moderate flow characteristics, high melting points and fast cure rates. Cores require a resin of slightly different characteristics than that used for molds whether the blowing or dumping technique is used.

Size Limit — Maximum pattern size on machines currently available is 30 by 40 inches and limits the possible size of castings. In experimental work so far various methods of heating patterns were tried but automotically controlled electrical heating probably will be-

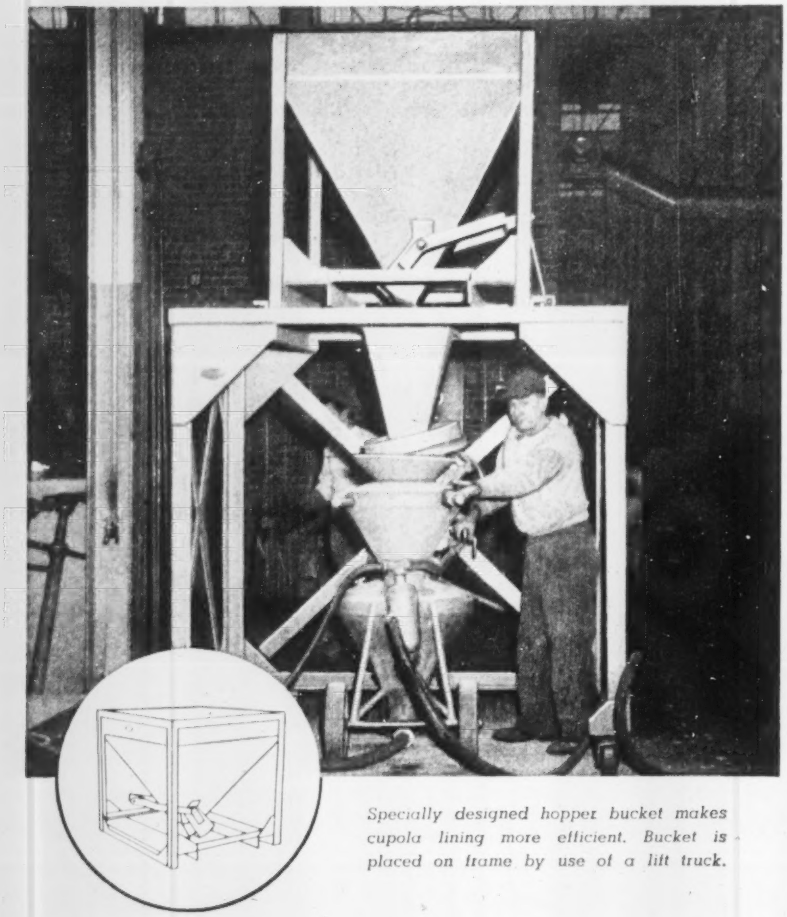
Drawing metal pattern from plaster mold. Cleanliness and use of a parting agent to prevent sticking of mix are of major importance



Operator removes half of shell mold for pipe fittings from machine. Top and bottom sections are formed at same time and then joined



Pouring ductile iron as part of development work underway to expand applications at International Nickel's experimental foundry



Specially designed hopper bucket makes cupola lining more efficient. Bucket is placed on frame by use of a lift truck.

Solve Your Material Handling Problems With **PENN IRON SPECIAL EQUIPMENT**

In lining cupolas, Textile Machine Works foundry in Reading, Pennsylvania, had difficulty handling the clay mix used with their Bondactor equipment. After a study of the problem, Penn Iron Works, Inc., designed, engineered and manufactured this special hopper bucket for maximum handling efficiency.

Whatever the bulk-material handling problem in your plant, Penn Iron Works, Inc., will be glad to help with its solution. Our wide experience in designing and manufacturing all types of buckets and special handling equipment for foundries can help you cut costs . . . save time . . . increase efficiency.

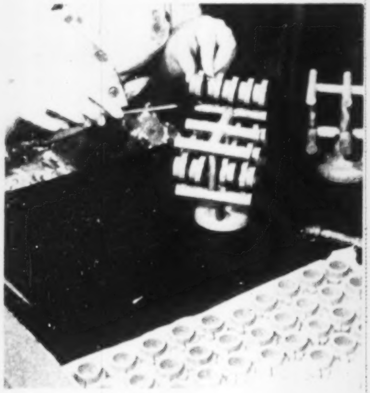
MEMBER FEMA FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC.

For Further Information Write:

PENN IRON WORKS, INC.
READING, PENNSYLVANIA

come standard for production work.

Pattern plate thickness of about $\frac{1}{2}$-inch is used for making small shells and projections are hollowed out on the shell, if possible, since uniform pattern thickness assures an evenly cured shell. Pattern and pattern plate should be made of the same material. Finish of the pattern is improved with a compound that provides a film on rougher surfaces. Coating is applied while pattern is cool and for best results is immediately baked in.



Joining individual patterns to specially designed sprue structure with heated tool for investment casting

No Sticking—Easy shell removal is made possible by adding a liquid release agent, usually a dilute solution of silicone mold release fluid. It can be sprayed on the hot pattern or the pattern can be dumped into a tank containing the release solution on small lot jobs. Ejector pins with heads larger than the diameter of bodies separate the shell from the pattern after curing.

First step in mold making is to have the sand resin mix come in contact with the heated pattern plate. Temperature for the pattern plate normally ranges from 300 to 550° F. Contact or dwell time varies depending on the shell thickness desired. The trick here is to make the thinnest shell that can be used both from the standpoint of economy and for minimum time consumption per mold.

Bake Well—Final curing of the shell is done in an oven with the temperature in the range from 350

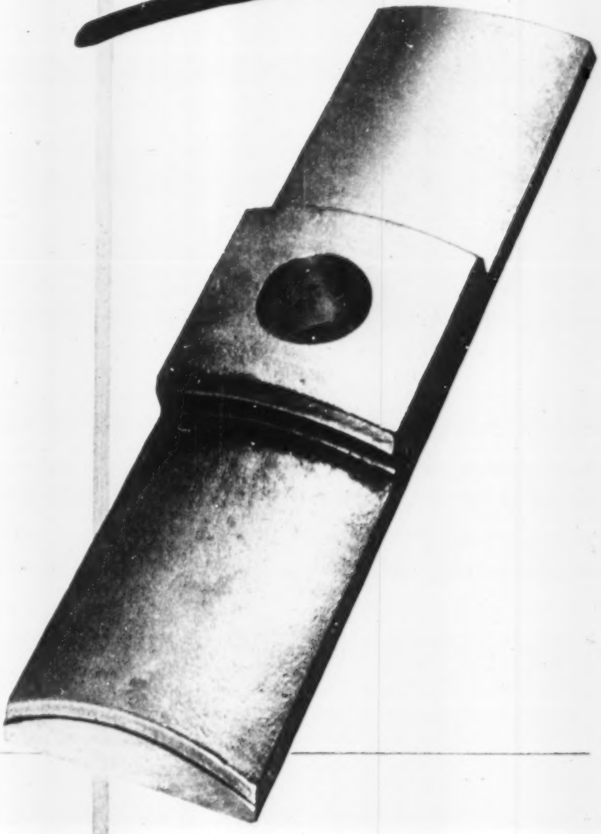
We Serve Steel Better

Knowing Copper Alloys Best

We specialize in copper and copper-base alloys such as bronze. And we cast these metals for steel industry use by the most advanced methods. For example . . . this aluminum bronze slipper is made by our permanent mold technique and requires *no machining* after casting except for the pin hole. Oil grooves are actually cast-in. Surface hardness is completely controlled, and our customers realize dollar savings through our production-run economies.

National Bearing Division offers you the benefits of more than 50 years of experience, metallurgical research and production-run facility development.

Our 6 centrally located plants are ready to serve you. Contact National Bearing Division for full information.



A FEW NATIONAL BEARING STEEL INDUSTRY PRODUCTS: Bosh Plates · Monkeys · Tuyeres · Coolers · Mantel Plates · Stack Plates · Roll Neck Bearings · Housing Nuts · Babbitt Metals · Slippers

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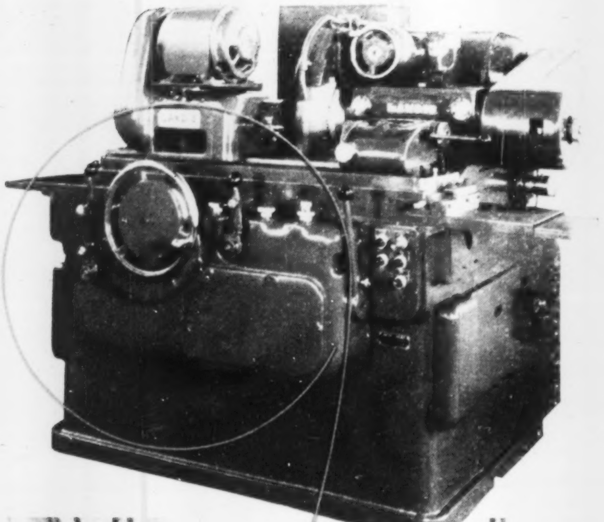
Wherever you use HYDRAULIC TUBING...



Photos courtesy Landis Tool Co., Waynesboro, Pa.

IT'S BEST TO SPECIFY *Summerill*

First off, there are important advantages in safety and strength without fabricating difficulties when you use tubing made of *steel* for hydraulic lines or other applications where liquids have to be carried under pressure dependably.

That's why the modern trend is to use steel tubing exclusively for such purposes . . . and there are equally good reasons why your selection of cold drawn seamless steel tubing should be *Summerill*. You can wrap up all the reasons in the fact that our new tubing plant, equipment and methods, backed by long years of experience, *do make a difference!*

- Specify "Summerill" for hydraulic tubing in any carbon steel size from 3/16" to 1½" O.D. It's a premium product in every sense. Only selected raw material is used, and every length is minutely inspected and tested. ***Summerill Tubing Company Division, Columbia Steel & Shafting Company, Pittsburgh 30, Pa.***

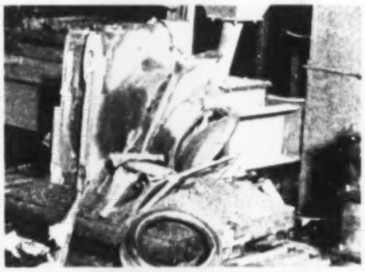
IN COLD DRAWN SEAMLESS STEEL TUBING

SPECIFY *Summerill* **AND BE SURE!**

W&D 4274

to 450 F and time from one to two minutes. Undercuring seems to be a more serious offense than overcuring, since in the latter event the shell is stronger and more easily cleaned from the finished casting.

Accurate registration in assembling the mold halves is generally achieved by a set of bevelled bosses on one half and a corresponding set of cavities in the other. Clamps or nuts and bolts originally served as the medium for assembling the two halves but recent work with special pastes and tapes indicates the latter two methods will see a lot of service at least for certain types of shells.



Immediately after shakeout, shells, castings and grit present this appearance. Castings are truck brake drums

Assembled molds are either placed in pouring racks or into flasks backed up with metal shot, grit or sand. Size of the casting and danger of the mold buckling during pouring determine whether backup material is used. Shell molds can be made up considerably in advance of pouring and stored in racks. The ability to store a large number of assembled shell molds in a relatively small area is a definite advantage for the process. Cooper Alloy Foundry Co., for example, has racks permitting storage of over 200 assembled molds for high alloy valves and fittings in a small area.

Ready To Go—That shell molding is out of its swaddling clothes is indicated by the layout being readied for its Indianapolis foundry by International Harvester Co. A conservative estimate of production is 3200 molds per 16-hour day. Two separate production setups will be used. The first has a six station rotary machine for high production

AMERICAN CHEMICAL PAINT COMPANY
AMBLER ACP PENNA.

Technical Service Data Sheet
Subject: SPECIFICATION RUST PROOFING AND PAINT BONDING CHEMICALS

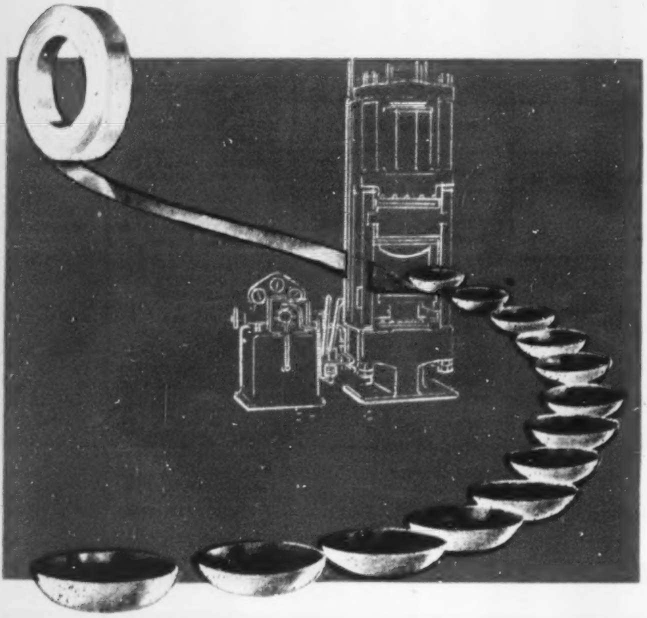
SPECIFICATION NUMBER	ACP SPECIFICATION CHEMICAL	SPECIFICATION TITLE
QQ-P-416	"LITHOFORM" "ZINODINE"	PLATING, CADMIUM (ELECTRODEPOSITED)
RR-C-82	"LITHOFORM" NO. 32	CANS, CORRUGATED: ASH AND GARBAGE, TAPER-SIDE, ZINC-COATED, WITH COVERS
MIL-C-5541 (See also QPL-5541-1)	"ALODINE"	CHEMICAL FILMS FOR ALUMINUM AND ALUMINUM ALLOYS
MIL-C-16232 Type I Type II	"THERMOIL-GRANODINE" "PERMADINE"	COATINGS — PHOSPHATE; OILED, SLUSHED, OR WAXED (FOR FERROUS METAL SURFACES) AND PHOSPHATE TREATING COMPOUNDS
MIL-E-917A (Ships)	"GRANODINE" "LITHOFORM" "ZINODINE"	EQUIPMENT, ELECTRIC POWER, BASIC REQUIREMENTS FOR (NAVAL SHIPBOARD USE)
MIL-L-3077	"PERMADINE"	LINKS, METALLIC BELT, FOR SMALL ARMS AMMUNITION
MIL-S-5002	"ALODINE" "GRANODINE"	SURFACE TREATMENTS (EXCEPT PRIMING AND PAINTING) FOR METAL AND METAL PARTS IN AIRCRAFT
MIL-V-3329	"GRANODINE"	VEHICLES, COMBAT, SELF-PROPELLED AND TOWED; GENERAL REQUIREMENTS FOR
JAN-C-490, Grade I	"GRANODINE"	CLEANING AND PREPARATION OF FERROUS METAL SURFACES FOR ORGANIC PROTECTIVE COATINGS
JAN-F-495	"GRANODINE" "LITHOFORM"	FINISHES FOR EQUIPMENT HARDWARE
JAN-L-548A	"PERMADINE"	LINK, METALLIC BELT, 20 MM., M8
JAN-T-704	"GRANODINE"	TREATMENT AND PAINTING (FOR CONSTRUCTION AND ENGINEERING EQUIPMENT)
AN-E-19	"ZINODINE"	ELECTRONIC EQUIPMENT; GENERAL SPECIFICATION FOR
AN-F-20 (See also U.S.A. 3-213)	"ALODINE" "GRANODINE" "LITHOFORM" "PERMADINE" "THERMOIL-GRANODINE" "ZINODINE"	FINISHES, FOR ELECTRONIC EQUIPMENT
U.S.A. 57-0-2C Type II, Class A Type II, Class B Type II, Class C	"THERMOIL-GRANODINE" "PERMADINE" "GRANODINE"	FINISHES, PROTECTIVE, FOR IRON AND STEEL PARTS
U.S.A. 51-70-1 Finish 22.02, Class A Finish 22.02, Class B Finish 22.02, Class C	"THERMOIL-GRANODINE" "PERMADINE" "GRANODINE"	PAINTING AND FINISHING OF FIRE CONTROL INSTRUMENTS, GENERAL SPECIFICATION FOR
U.S.A. 50-60-1	"GRANODINE"	CONTAINERS, METAL, FOR ARTILLERY AND ROCKET AMMUNITION
U.S. Navord O. S. 675	"ALODINE"	SPECIFICATIONS FOR THE MANUFACTURE AND INSPECTION OF CARTRIDGE, POWDER, AND ROCKET TANKS (ALUMINUM)
U. S. N. Appendix 6	"LITHOFORM"	INSTRUCTIONS FOR PAINTING GENERAL SPECIFICATIONS FOR BUILDING VESSELS OF THE UNITED STATES NAVY
M-364	"PERMADINE" "THERMOIL-GRANODINE"	NAVY AERONAUTICAL PROCESS SPECIFICATION FOR COMPOUND PHOSPHATE RUST-PROOFING PROCESS
16E4 (Ships)	"ALODINE" "GRANODINE" "ZINODINE"	ELECTRONIC EQUIPMENT, NAVAL SHIP AND SHORE: GENERAL SPECIFICATION
AN-C-170	(See MIL-C-5541)	CHEMICAL FILMS FOR ALUMINUM AND ALUMINUM ALLOYS
U. S. A. 72-53	(See AN-F-20)	FINISHES (FOR GROUND SIGNAL EQUIPMENT)
AXS-1245	(See JAN-C-490)	CLEANING AND PREPARATION OF FERROUS METAL SURFACES FOR ORGANIC PROTECTIVE COATINGS (EXCEPT FIXED INSTALLATIONS)

CHEMICALS ACP PROCESSES

WRITE FOR DESCRIPTIVE FOLDERS ON THE ABOVE CHEMICALS AND FOR INFORMATION ON YOUR OWN METAL PROTECTION PROBLEMS

CHEMICALS ACP PROCESSES

FOR A FINE FINISH
ON YOUR QUALITY PRODUCTS
USE FOLLANSBEE
COLD ROLLED STRIP



For fabricating your quality products with a fine finish—use Follansbee Cold Rolled Strip.

Follansbee Cold Rolled Strip is rolled, tempered and supplied to your specifications—a custom-made, quality strip that fulfills most manufacturing needs.

Follansbee custom-quality Cold Rolled Strip can be delivered from the mill directly to you providing a continuous supply of uniform steel from coils to your automatics, regardless of forming operations involved. For flat stamping to deep drawings, Follansbee Cold Rolled Strip is the answer to your production problems.

Consult your trained Follansbee Steel representative.
He will be glad to discuss your fabricating problems with you.

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GENERAL OFFICES, PITTSBURGH 30, PA.

POLISHED BLUE SHEETS AND COILS   SEAMLESS TERNE ROLL ROOFING
COLD ROLLED STRIP

Sales Offices—New York, Philadelphia, Rochester, Cleveland, Detroit, Milwaukee. *Sales Agents*—Chicago, Indianapolis, Kansas City, Nashville, Los Angeles, San Francisco, Seattle; Toronto and Montreal, Canada. *Mills*—Follansbee, W. Va.

FOLLANSBEE METAL WAREHOUSES
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of a single item and the second has six single-station machines for procuring a wide variety of parts with high flexibility but with increased handling costs.

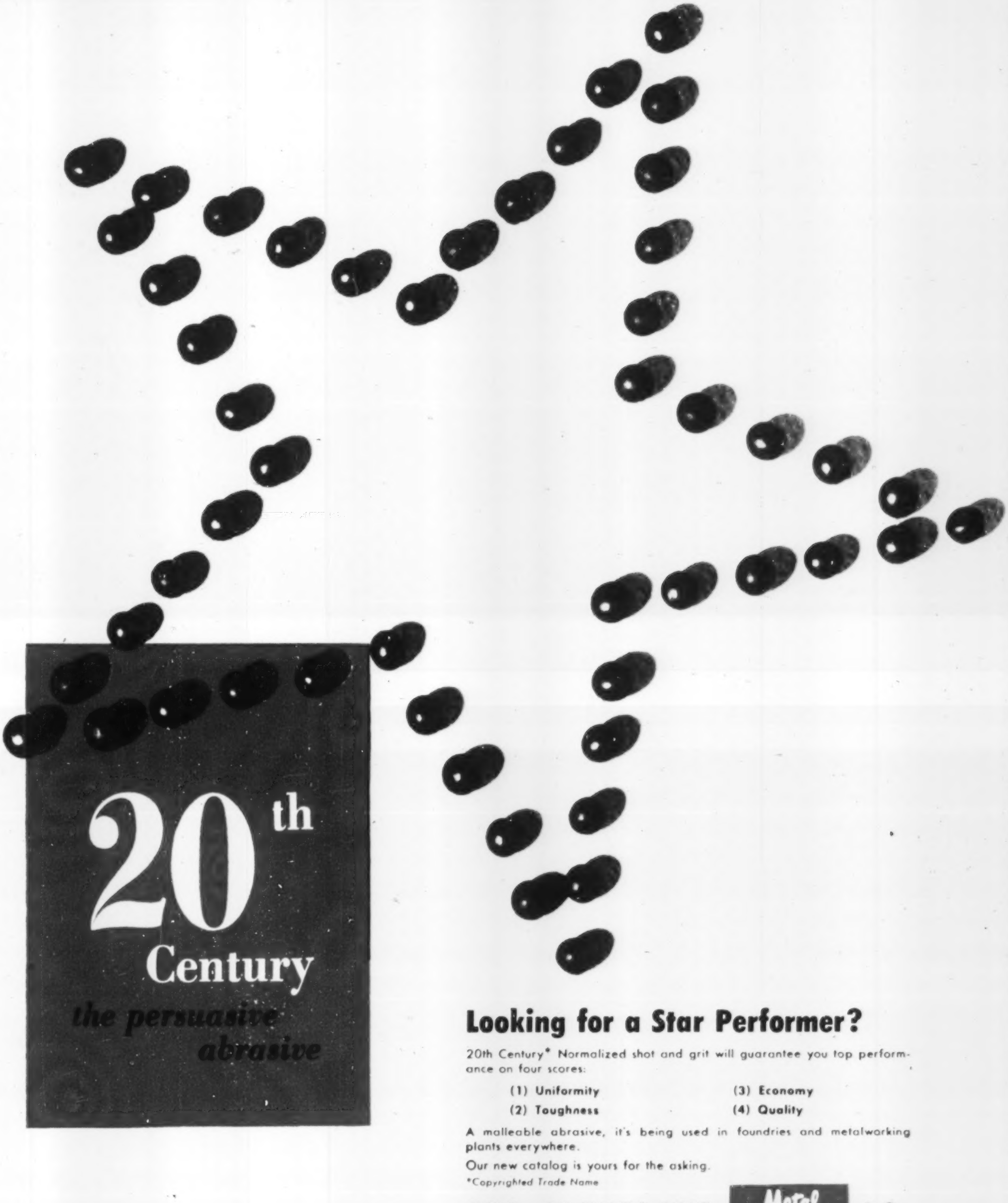
In addition to about ten machines for mold-making commercially available this year, several large foundries have home-designed units. Machines range from single station units to 12-station rotaries with varying degrees of automaticity.

While the big push was on mold making machines last year, core making units lagged behind. This year should see progress in shell core making machines for both simple and more complex cores. Another area where the bulk of work is still ahead is in the development of practical mechanical equipment for removing the hot cured shells from shell making machines.

Getting Close Study—Attracting less attention outside the foundry industry but considered by many within to have great significance is the basic cupola. Cumulative sulphur absorption and declining raw material quality make it increasingly difficult to meet the more rigid and varied metallurgical expectations with materials available and with chemical limitations of the acid cupola.

Foundries find the basic cupola profitable for normal gray iron melting because of its ability to use higher sulphur raw materials. Total carbon and silicon control is more difficult but by proper operation and not too zealous a desire to remove all the sulphur these elements can be controlled within reasonable limits. Basic, low sulphur metal is ideal for making nodular iron and most foundries engaged in its production are installing basic cupolas or contemplating doing so.

Quality Drop—Trends in declining coke quality seem to be toward higher sulphur and higher ash content. Such coke tends to produce high-sulphur low carbon metal. Basic slag is effective against both these tendencies. Coke containing 14 per cent ash, 5 per cent volatile



Looking for a Star Performer?

20th Century* Normalized shot and grit will guarantee you top performance on four scores:

(1) Uniformity	(3) Economy
(2) Toughness	(4) Quality

A malleable abrasive, it's being used in foundries and metalworking plants everywhere.

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THE CLEVELAND Metal Abrasive CO.

802 East 67th Street Cleveland 8, Ohio
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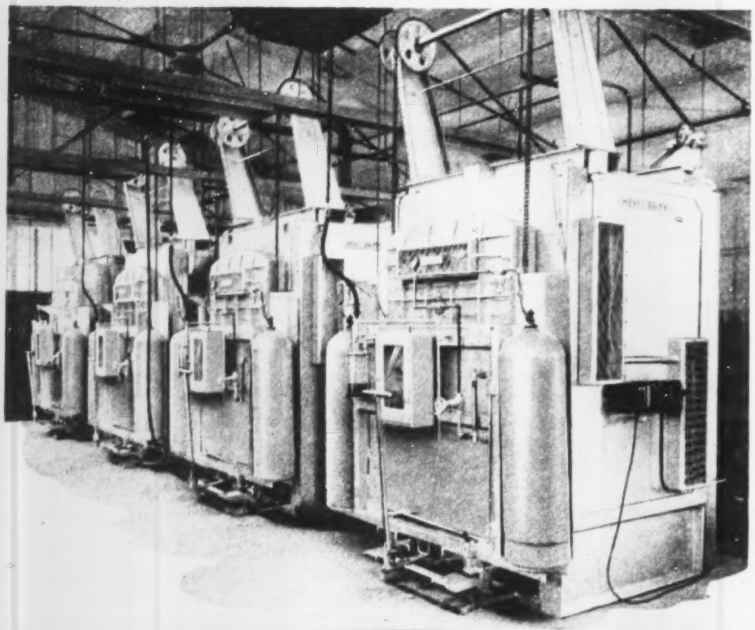
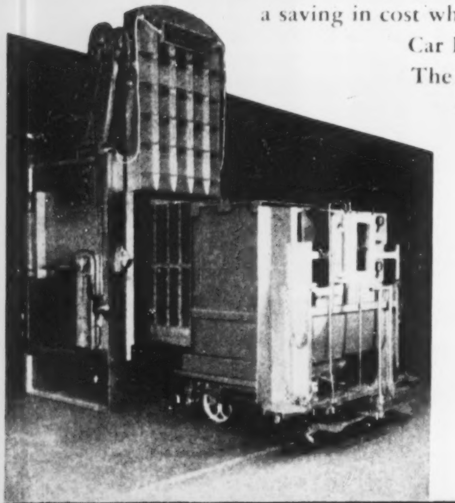
One of the world's largest producers of *quality* shot, grit and powder —Normalized—Hard Iron—Cut Wire



FOR INCREASED PRODUCTION OF NITRIDED PARTS USE A HEVI DUTY CAR BOTTOM NITRIDING FURNACE

Manufacturers producing nitrided parts for aircraft, engines, and heavy machinery items have found that more production is possible at a saving in cost when they use the Hevi Duty Car Bottom Nitriding Furnace. The furnace car, complete with sealed retort and ammonia dissociation equipment can be removed from the furnace for cooling and a second car with a cold load can be inserted immediately for a minimum loss of time between heats.

Write for Bulletin HD-664



HEVI DUTY ELECTRIC COMPANY
HEAT TREATING FURNACES HEVI DUTY ELECTRIC EXCLUSIVELY
DRY TYPE TRANSFORMERS — CONSTANT CURRENT REGULATORS
MILWAUKEE 1, WISCONSIN

and 2 per cent sulphur, normally considered unsuitable for cupola melting, has yielded satisfactory iron.

Basic operations are not justified where suitable pig iron and scrap are available locally and coke quality is good. On a high-silicon, low-carbon iron the cost of the higher silicon loss plus increased refractory cost is greater than savings from the elimination of forehearth desulphurization.

Finding Its Field—Nodular or ductile iron is finding a place as an engineering material. Production for 1952 is estimated at nearly 100,000 tons. Casting size ranges from small items like valve wheels to die block anvils weighing 50 tons. Its castability and high strength makes the material suitable for numerous pressure applications. Cams, gears, sprockets and bearings are now being made from ductile iron. Flame or induction hardening to 550-600 Brinell gives exceptional wear resistance.

Fatigue resistance of ductile iron is comparable to the ordinary grades of steel both in the notched and unnotched conditions. This property in combination with its wear resistance and relatively high, constant modulus of 25 million psi makes it well suited for applications like: Crankshafts, generator shafts, connecting rods, etc. where part is subject to alternating stresses and bearing wear.

Uses Expand — Pearlitic malleable iron is experiencing further growth as applications expand and more foundries become equipped to produce it. Its field is steadily increasing wherever rigidity, high strength and wear resistance are important factors. In the grades covered by ASTM specification A 220-50, the ultimate strength ranges from 60,000 to 90,000 psi, the elongation in the former being a minimum of 10 per cent and in the latter 2 per cent.

Steel foundries operating at high levels are giving maximum consideration to equipment and methods permitting increased production of castings. Improved and faster mold handling results from

Sharon 430

STAINLESS STEEL

SHARONSTEEL

SHARON STEEL CORPORATION

SHARON, PENNSYLVANIA

SHARON '430' STAINLESS IS IN GOOD SUPPLY AND IS AVAILABLE WITH FEW RESTRICTIONS

Sharon has prepared a fully illustrated booklet primarily for those who had been using one of the metals now in short supply. It is intended to introduce or reacquaint the reader with the possibilities of Type 430 Stainless Steel as a highly satisfactory primary or alternate material. The booklet contains basic fabrication information compiled to aid manufacturers in their consideration of this metal.

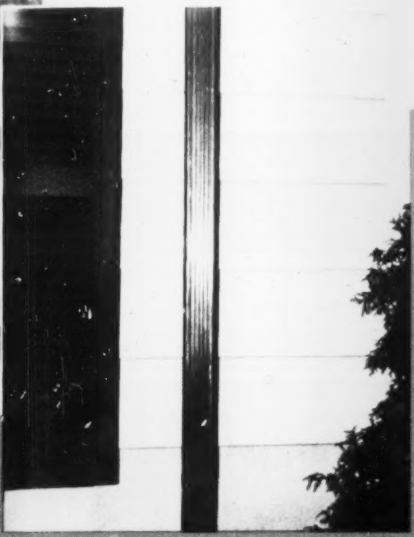
This booklet may contain the answers to your problems. Write for it today or contact the Sharon representative nearest you and ask him to see that you get your copy. Sharon district sales offices listed on back of next page for ready identification.

In today's economy Type 430 Stainless Steel is assuming an ever-increasing importance to producers of metal products. Government control over other metals has multiplied the difficulties of those fabricators who produce primarily for civilian consumption.

Sharon '430' Stainless is in good supply and available with few restrictions as to end use. It contains about 17 percent chromium with no nickel and has been the most popular ferritic grade of stainless steel. It comes the nearest to meeting the all-around requirements for general use. It was used before the chrome-nickel stainless steels and has a remarkable history of successful application. Absorption towers, used in the manufacture of nitric acid, made of this type in 1926 are still in service. In the automobile industry it has been especially popular. Large tonnages go into trim and window moldings where the material must meet demanding requirements, both in complex fabrication and in abusive service conditions.

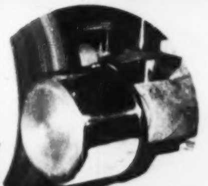
Sharon '430' possesses good mechanical and physical properties and a ductility about three-fourths that of deep drawing quality carbon steel. Extra deep drawing requires more power, more clearance and more carefully selected lubricants than for ordinary steel. Intermediate annealing and pickling may be necessary.

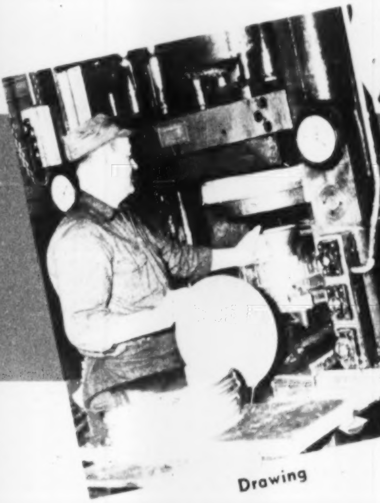
Sharon straight chrome stainless may be



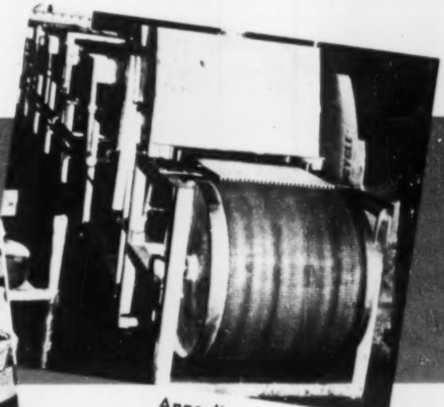
Major auto builders and leading architects have used Sharon '430' Stainless Steel Strip for years. The unretouched pictures here indicate the great durability of this material under the most grueling conditions. Both the roof drainage system and automotive trim have been in constant service for more than 10 years.

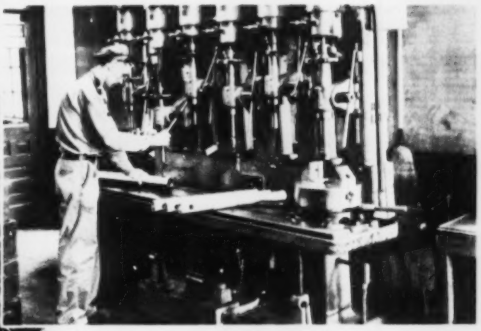
Illustrations from Sharon 430 Booklet


Polishing


Drawing

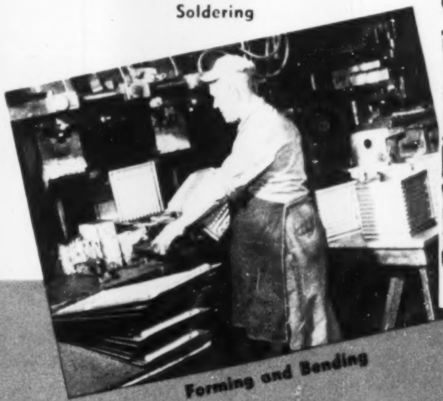
Spinning

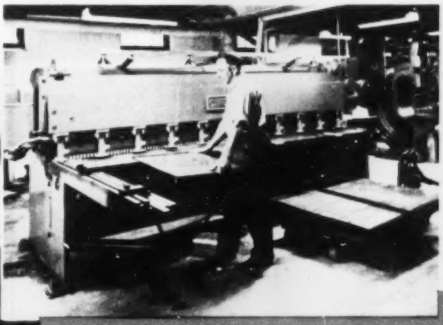

Annealing


Drilling

Soldering

Welding


Forming and Bending


Cutting

Roll Forming

welded for certain applications. Sharon also produces a titanium modified grade of 430 (430 Ti) which has superior bending qualities, is a better welding steel, and has superior corrosion resistance to that of regular 430.

A thin adherent scale is formed at temperatures as high as 1550°F. Formation of this protective scale, which does not crack away and reform, permits the use of Sharon '430' in intermittent heating operations.

Sharon '430' is suitable for a great many applications in products generally manufactured of other steels and metals. If the shortage of critical materials has threatened your production, consult with the Sharon office nearest you . . . '430' may be your answer.

TYPICAL APPLICATIONS *for Sharon 430 Stainless Steel . . . .*

AUTOMOTIVE
- Grilles
- Horn rings
- Hub caps
- Mufflers
- Panels
- Trim
- Wheel rings
- Wheel covers
- Windshield wipers

CONSTRUCTION
- Decorative trim
- Down spouts
- Electrical hardware
- Flashings
- Gutters
- Kick plates
- Lighting
- Mouldings
- Roofing
- Screens
- Sheathing
- Spandrels
- Store fronts
- Tile and trim
- Window frames, channels and guides

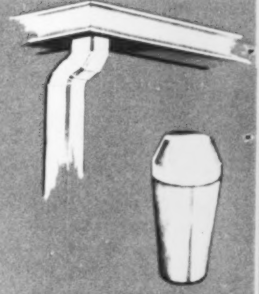
RAILROAD
- Diesel grilles
- Kick and push plates
- Refrigerator car parts
- Trim and decorative parts in passenger cars

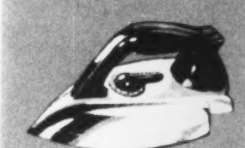
HOUSEHOLD APPLIANCES
- Clothes driers
- Floor waxers and polishers
- Heating and cooking appliances
- Home and farm freezers
- Ironers and irons
- Lamps
- Ranges and stoves
- Refrigerators
- Refrigerator dishes
- Sewing machines
- Shavers, electric
- Toasters
- Vacuum cleaners
- Washing machines

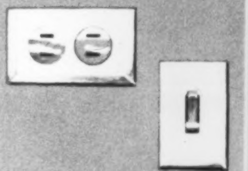
KITCHEN
- Egg beaters
- Food serving trays
- Juicers
- Knives
- Mixers and mixing bowls and spoons
- Potato mashers
- Pots and pans
- Salt and condiment containers
- Spatulas

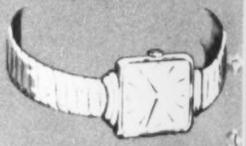
REFRIGERATION AND AIR-CONDITIONING
- Bottled beverage coolers
- Carbonated water systems
- Drinking fountains
- Fans
- Fountainettes
- Frozen food cabinets
- Ice cube makers
- Malt beverage dispensing system
- Refrigeration evaporators
- Refrigerator shelves and trim
- Room air conditioners
- Sandwich units
- Thermostats

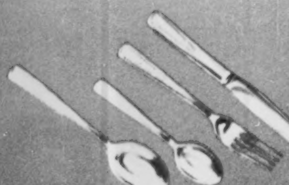
GENERAL
- Ash trays
- Automatic vending machines
- Bar equipment
- Buttons and button parts
- Cheese slicers, commercial
- Cocktail shakers and accessories
- Cup holders
- Flatware
- Furniture
- Garden accessories
- Irons
- Jewelry
- Ladles
- Paint brush ferrules and rivets
- Radio and TV antennae
- Railings
- Refuse cans
- Rulers
- Soda fountains and equipment
- Utility cans
- Water pitchers and drinking cups
- Weather stripping

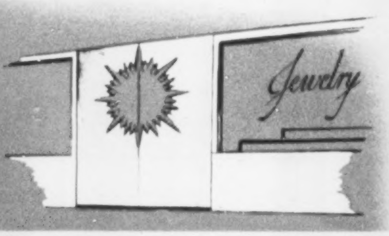












In these unsettled times you need all the information possible regarding materials and their use. Be sure to get your copy of this latest Sharon bulletin giving you up-to-the-minute information about Sharon '430' Stainless Steel. Contact one of the Sharon offices listed below or write direct and your copy will be in the return mail.

SHARON STEEL CORPORATION
GENERAL OFFICES—SHARON, PENNSYLVANIA

SALES OFFICES

CHICAGO 4, ILLINOIS
1822 McCormick Building
Phone: Harrison 7-2526

CINCINNATI 2, OHIO
2407-08 Carew Tower Bldg.
Phone: Main 1718

CLEVELAND 14, OHIO
1809 Union Commerce Building
Phone: Main 1-3135

DAYTON 2, OHIO
1801 Hulman Building
Phone: Fulton 5012

DETROIT 8, MICHIGAN
Tireman and Maple Avenue
Phone: Tiffany 6-1500

INDIANAPOLIS 4, IND.
425 Chamber of Commerce Building
Phone: Lincoln 7318

LOS ANGELES 13, CALIF.
524 South Spring Street
Phone: Mutual 5481

MILWAUKEE 2, WIS.
716 First Wisconsin National Bank Building
Phone: Broadway 2-7450

NEW YORK 18, N. Y.
500 Fifth Avenue
Phone: Pennsylvania 6-8744

PHILADELPHIA 3, PA.
1138 Broad St. Sta. Bldg.
Phone: Rittenhouse 6-0985

ROCHESTER 4, NEW YORK
503 Genesee Valley Trust Building
Phone: Baker 2540

SAN FRANCISCO 5, CALIF.
902 Monadnock Building
Phone: Garfield 4335

WASHINGTON 4, D. C.
Munsey Building
Phone: National 4874

CANADIAN REPRESENTATIVES

MONTREAL 3, QUEBEC
80 Prince Street
Phone: University 6-5761

TORONTO 17, ONTARIO
235 Wicksteed Avenue
Phone: Mayfair 0701

Litho in U.S.A.

the installation of mold machines up to semi-automatic index types. Fast acting and quick changing core blowers handle universal types of sand. Even stiff sands of poor flowability for spindle shape cores were added to the core rooms. Cores upward of 60 pounds and entire molds can now be blown. The first dielectric corebaking unit was installed in a jobbing foundry last year.

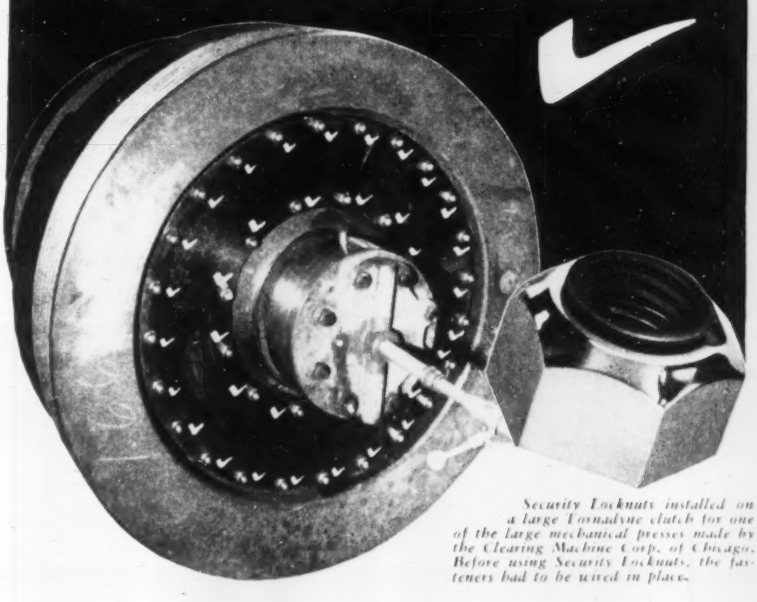
Rugged Jobs—High alloy castings are expanding their field of influence. Production now is about twice what it was during peak of World War II years. With applications where heat, corrosion and abrasion resistance are major factors constantly on the increase, high alloy castings are assured of a ready market ahead.

Two new but valuable customers are jet engine builders and the Atomic Energy Commission. Already large quatities of corrosion resistant castings are being used in atomic energy plants and further increases in this field are expected. Jet engine uses include support rings machined from centrifugal castings of a 25 per cent chromium, 14 nickel, 3 tungsten alloy and nozzle diaphragms and diffuser cones cast in columbium-stabilized 19 chromium, 9 nickel.

Precision castings are enjoying a period of high activity with military and electronic applications of great importance. Parts can be made with tolerances of 0.001-inch per inch. Some of the jobs are so small that the layman would not ordinarily regard them as castings since it takes several hundred to weigh an ounce. Castings are made from alloy steel, beryllium-nickel, beryllium-copper, brass, bronze and aluminum.

Die Casting—Light weight of the finished component and the ability to cast it to close dimensions make die castings attractive for many applications. Size of parts that can be produced on the new machines is constantly growing and the process is no longer considered one that is applicable only to small parts. Zinc and aluminum die castings already are enjoying wide use and

CHALLENGE US!



Security Locknuts installed on a large Tornadyne clutch for one of the large mechanical presses made by the Clearing Machine Corp. of Chicago. Before using Security Locknuts, the fasteners had to be wired in place.

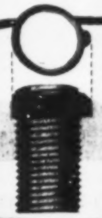
WHAT is your fastener problem? Are you wiring nuts in place? Are you paying the extra cost of installing cotter pins? Are you peening the ends of bolts and making removal or repair difficult?

Challenge us to solve that fastener problem! We are doing it for others and can do it for you.

We would like to have you see the results of tests that have proved the Security Locknut practically vibration proof. A Security Locknut holds and stays "put" even in the face of vibration that destroys the bolt. Security Locknuts can be adjusted and re-adjusted any number of times but more important, they can be removed and re-used over and over again without materially losing their locking power and without damage to the bolt.

If you have a vibration or fastener problem accept our challange. Ask for a sample Security Locknut. Send the coupon. No obligation, of course.

SECURITY LOCKNUT CORPORATION
North Ave. and 15th Ave., Melrose Park, Ill.



This picture shows a cross-section of a Security Locknut. The insert, indicated removed, is of high quality, heat treated, alloy spring steel and becomes a permanent part of the nut.

The insert is elliptical in shape and this design causes the retainer to grip the bolt with the terrific tension that only spring steel of great strength could exert and prevent the nut from turning. Simple—dependable—positive.

SPECIAL OFFER!

Here's an easy way to arrive at thread tolerance figures. Ask for a Security Thread Tolerance Chart. Just spin the dial and you have the figure you need. Send the coupon. It's yours for the asking.

Security
The Nut You Can't Shake Loose

SECURITY LOCKNUT CORPORATION
North Ave. and 15th Ave., Melrose Park, Ill.
Please send me without obligation:
☐ One of your Thread Tolerance Charts
☐ We have a fastener problem and would like to know more about Security Locknuts.
Company Name
Address
Town Zone State
Signed

AT YOUR SERVICE 2 NEW Shenango bulletins

SHENANGO
Centrifugal Castings
SHENANGO-PENN MOLD CO
CENTRIFUGAL CASTINGS DIV
FOR PLUS VALUES in quality and uniformity
SHENANGO
NON-FERROUS
Centrifugal Castings
SHENANGO-PENN MOLD COMPANY
CENTRIFUGAL CASTINGS DIVISION
DOVER, OHIO

. . . on symmetrical or annular parts, ferrous and non-ferrous

If your plans call for bushings, liners, sleeves, rings, rolls, or *any* essentially symmetrical shape, find out about the many advantages you stand to gain with Shenango centrifugally cast parts.

BULLETIN NO. 150 covers non-ferrous parts in manganese and aluminum bronzes, red bronzes, brass, Monel Metal and special alloys.

BULLETIN NO. 151 covers parts of Meehanite Metal, Ni-Resist and special iron alloys.

These new bulletins show typical Shenango produced parts that are saving time, trouble and cost in industries everywhere. Get the facts. Either or both bulletins are yours for the asking.

SHENANGO-PENN MOLD COMPANY
Centrifugal Castings Division
Dover, Ohio
Executive Offices: Pittsburgh, Pa.

SHENANGO

ALL RED BRONZES · MANGANESE BRONZES · ALUMINUM BRONZES
MONEL METAL · NI-RESIST · MEEHANITE® METAL

magnesium applications are expanding steadily.

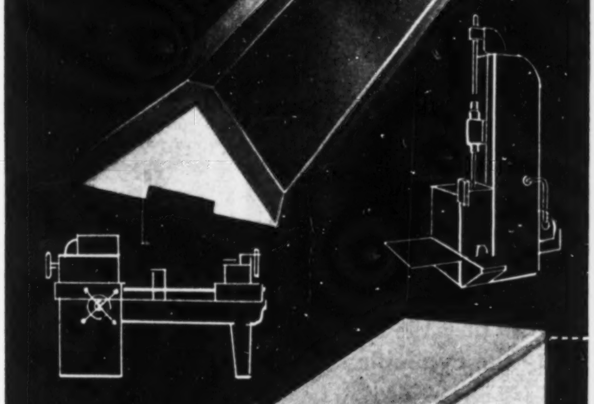
More and more companies are able to produce die castings of plating quality in all metals, thereby expanding the list of possible applications. Cold chamber machines occupy the dominant position in aluminum and magnesium fields today and most machines currently being installed or on order are of this design.

An automatic pouring unit for aluminum and zinc die casting, based on the low frequency induction furnace, enables the die caster to automatically pour measured amounts of molten metal. Weight of the casting can be set on a control panel dial and repeated automatically thereafter. These controls can be linked with controls on automatic machines permitting fully automatic operation during each cycle and eliminating the time delay of ladling.

Sandwich Method—Wider use of welding and brazing techniques to produce complex shapes from simple castings will broaden the list of potential castings customers. It isn't a new idea but developments in the last year make it more attractive from economic and engineering standpoints.

Illustrative of this method is Alcoa's furnace brazing of aluminum alloy automotive castings to form engine blocks and cylinder heads. The component castings are easier to make and the process has the added flexibility of being able to make either six or eight cylinder engines from the same basic castings. The six has a front, rear and middle section, the eight merely requires the addition of another middle section.

A gasket-like piece of fluxed brazing alloy containing 12 per cent silicon to make it melt at a lower temperature than the parent metal is put between each section and the assembly is inserted in a gas-fired convection furnace. Weight of the castings is often enough to hold the parts in place and use of only simple jigging fixtures is required. Alcoa expects that by 1954 use of aluminum in cylinder heads will be four times what it was in 1950.



it's OK

let'em go with OK hardened ways, gibs, ball races, and Ampco bronze wear strips

The ultimate success and accurate life of your machine depends to a large extent on the accuracy, and uniform high hardness of its ways, gibs, ball races or wear strips. OK parts are the finest. They are made of special tool steel welded to a backing of soft tough steel under 2500 tons pressure, then hardened to a Rockwell C-65-66 and ground to tolerances of ± .00015 (both straight and parallel). They are available in all sizes and shapes, to meet your particular requirements.

OK wear strips are now available in welded Ampco bronze. Because of the OK's special bi-metal method of welding, less bronze is required. These ways are ground to close tolerances thus reducing manufacturing and assembly time.

Mail coupon below for comprehensive bulletins.

Manufacturers for the Metal Working Industry of Slitter Knives, Shear Blades, Rotary Shear Knives, Hardened Spacers, Hardened Ways, Gibs, Ball Races, Bronze Ways, and Wear Strips.

OHIO KNIFE CO., DEPT. C
Cincinnati 23, Ohio

Please send free Bulletins on OK ways, gibs, etc.

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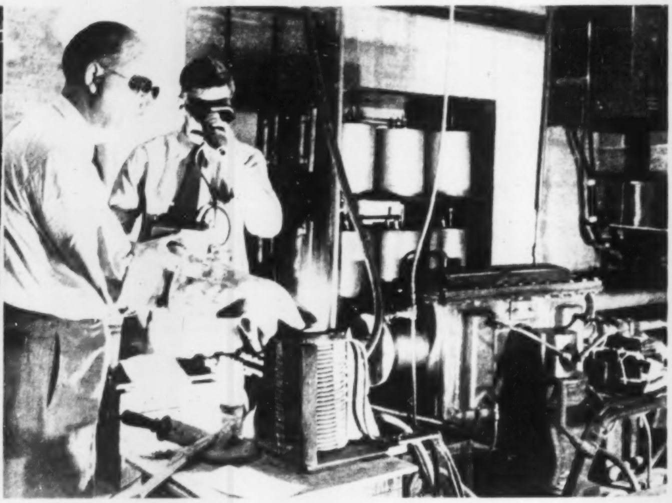
THE OHIO KNIFE CO.

CINCINNATI 23, OHIO

Demand for materials of superior strength and durability to increase efficiency of the gas turbine challenges combined talents of metallurgy and engineering



Need for conservation of critical metals speeds search for new high temperature alloys. Here, International Nickel research workers are making experimental melts

FORUM ON TECHNICAL PROGRESS

Materials and Metallurgy

Competition for materials can be met in only one way: Unique properties of each material must be used in best possible manner. New alloys of improved strength and durability are available

JETS, rockets and supersonic speeds are putting the metallurgist on the spot.

With every advance designers make to increase the efficiency and speed of jet aircraft, the need for better alloys seems to increase too. The metallurgist has come through. New alloys have made it possible for parts to operate at higher temperatures and to last longer. Strategic content has even been lowered in some cases.

Nor has the metallurgist been asleep at the switch on the day-by-day production problems arising from shortages and adjustments due to reduction of strategic elements in alloys.

In constructional alloy steels, boron steels have been tested sufficiently to indicate that in many cases they can replace more highly alloyed materials. Some limitations of the boron steels have been shown in carburizing applications. Most important point settled last year was the influence of boron in the higher carbon levels of the case of carburized parts.

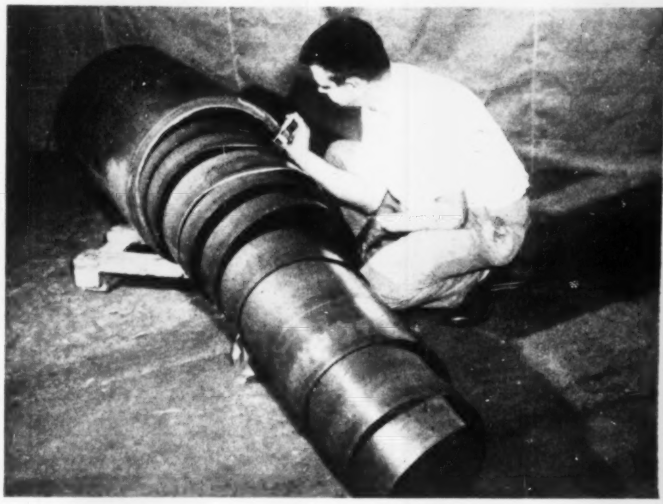
In high temperature alloys, there is a trend toward standardization of alloy chemistry for elevated temperature service and a simmering down of the number of high temperature alloys being considered for use under combined high stress and temperature.

Titanium took the No. 1 spot in materials for structural use. Future prospects are for rapid expansion. Present output is about 1200 net tons per year to be increased to 22,000 net tons by 1955. Prices should be lower and product will be more uniform.

Takes to the Air—Titanium is now going into production applications. Lockheed and North American Jet fighters are using RC-70 and RC-130-A parts. One jet engine manufacturer is going into tonnage trial production of RC-130-B forgings. Convair will incorporate titanium in production quantities into B-36 planes.

Douglas Aircraft is making the airframe industry's first nonmilitary application of titanium. About 88 per cent of the skin on DC-7 engine nacelles will consist of titanium sheet. Areas in which titanium will be used include the structural covering of the aft nacelles, some frame and landing gear doors. Unalloyed titanium will also be substituted for stainless steel now used for firewall webs.

Why is Douglas using titanium? Their answer: It has the strength of steel and weighs only 56 per cent as much. Another point in its favor is that heat resistant qualities are superior in some applications to stainless steel. An-

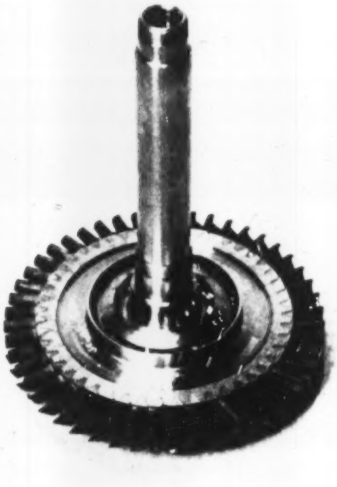


First wide thin titanium strip was produced by Rem-Cru Titanium Inc. This pioneer strip, shown above measused 3 feet wide, 0.015-inch thick and 460 feet long

Radioactive melt being made inside hood at the Carnegie Institute of Technology in research on mechanism and kinetics of steelmaking reactions

other reason, and probably most important at this time, is that they are anxious to get experience in design, fabrication and use of the metal. At its present price it is extremely doubtful if the use of titanium can be justified on an economic basis.

Speed-Up—Hoping to crowd 10 years normal development into two, the Air Force has notified contractors that it will accept a fair share of the increase in production cost resulting from use of titanium. Suppliers will feel the effect of this program. Titanium will be required in the form of bolts and nuts, forgings, sheets and bars in various sizes and shapes.



Fir-tree joints attach investment cast Hastelloy C turbine blades to forged Multimet disk in this gas turbine part

How Hot—Like anything else, titanium has limitations. It is not a high temperature metal as its melting point of 3150 F indicates. It should not be used for long service applications which will exceed 950 F at the extreme. Many designers consider 800 F as the safe limit.

Strength-weight properties of titanium-base materials at various temperatures depends on whether their crystal structure is alpha or beta, or a combination of the two. Applications to date have been almost entirely with alpha-beta alloys. These have a medium alloy content in the range of 3 to 9 per cent by weight.

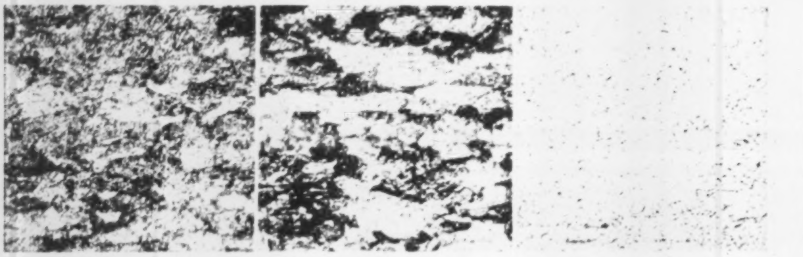
Atoms Execute a Maneuver—Titanium's metallurgical versatility is in part based on its ability to transform from one crystal structure to another depending on temperature. When the molten metal freezes, the atoms group into the beta or body centered cubic pattern.

When this hot, solid titanium cools still further, the atoms line up in the alpha or hexagonal close packed structure. These different crystal structures provide distinctly different mechanical properties. And that's not all their reaction with alloying elements is quite different.

Where They Fit—Alpha-beta alloys are presently and probably will long continue to be the work horses. Here's why: 1. Double the strength of unalloyed titanium; 2. Good ductility, including bend; 3. Forging, rolling and forming easier than alpha and than beta; 4. Relatively simple to produce; 5. Heat treatable to high strengths.

Chalk-up one mark which may work against the alpha-beta system in some applications. Temperature ceiling for useful strength is about 800 F.

The alpha alloys have a bright future for a wide variety of prod-

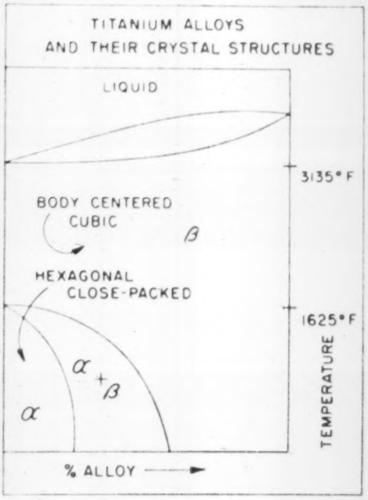


Water quenched at 1250°F 60% alpha, 40% beta

Water quenched at 1350°F 20% alpha, 80% beta

Water quenched at 1450°F 5% alpha, 95% beta

Photomicrographs above illustrate titanium structures



ucts requiring good oxidation resistance, hot strength and weldability. They show useful strength to almost 1200°F and resistance to air contamination to 2000°F. Sheet bend ductility is not as good as some other combinations.

For the Real Hot Spots—Typical super-alloy for high temperature use has a solid solution matrix of iron and chromium with at least enough nickel to provide a fully austenitic structure at room temperature, and with cobalt or nickel substituting for part, if not all, of the iron content. If stresses are high and if temperatures are much in excess of 1000°F austenitic chromium-nickel alloys are used.

Less Strategic—Last year witnessed tests on a new iron base alloy containing 20 per cent chromium, 35 per cent nickel, and 1 per cent titanium for use in hot operating sheet metal parts. Development work is being pushed on reduced cobalt-content alloys for high temperature precision castings. A high nickel-chromium alloy containing tungsten and molybdenum with only about one-fourth the amount of cobalt normally used looks good.

Saves Scrap — More attention was turned toward alloys which could use high temperature scrap. Haynes Alloy No. 99 is one answer that blossomed-out. Sometimes called "Hash" alloy, metallurgists look on it as a modified N-155 containing less cobalt and no columbium, with little boron.

Approximate composition is 20-22 per cent chromium, 2-3 tungsten, 11-13 cobalt, 17-19 nickel, 3-4 molybdenum, 0.03-0.08 boron and about 1 per cent each of silicon and manganese and the remainder iron. This alloy is making a good name for itself as an alternate for more strategic alloys.

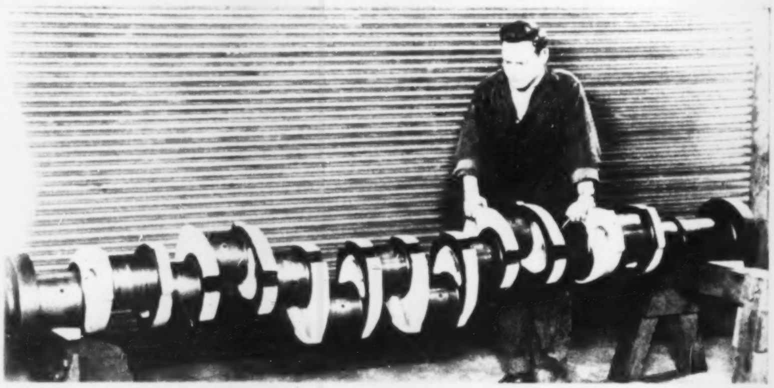
Looks Good—Latest report on Hastelloy Alloy X, which was pushed out of the laboratory early last year, shows that it is making the grade. It is designed to replace strategic cobalt and columbium bearing alloys and high nickel, low iron materials in some places, such as sheet metal components in jet engines and tail cones. Nominal composition of the alloy looks something like this: 22 per cent chromium, 45 nickel, 9 molybdenum with the remainder iron. High iron content is significant, since it can be made with less strategic ferrochromium in place of pure chromium metal. Not to be overlooked, here too, is the scrap angle, since material containing relatively large amount of iron may be used.

Short Life Specials — Interest continued during 1952 in the use of heat treated low-alloy steels as substitutes for more alloyed ones in relatively short life temperature applications involving highly stressed parts.

Steels receiving most attention for this type of service can be subdivided into two groups on the basis of chromium content. One group contains up to 6 per cent chromium and the other, 12 to 14 per cent. In addition to chromium, these steels contain various combinations of molybdenum, silicon and vanadium and considerable work is in progress on titanium and boron modifications. Two of the most popular 12 to 14 per cent chromium types also contain columbium.

Stock Going Up—During 1952, an old material, molybdenum, gained ground as a base for strong high temperature alloys.

Molybdenum, due to its extreme-



Fatigue resistance of ductile iron in combination with wear resistance and high constant modulus of 25 million psi recommends it for use as crankshaft material

HERE IS HOW

ALTER COMPANY

CAN WORK FOR YOU

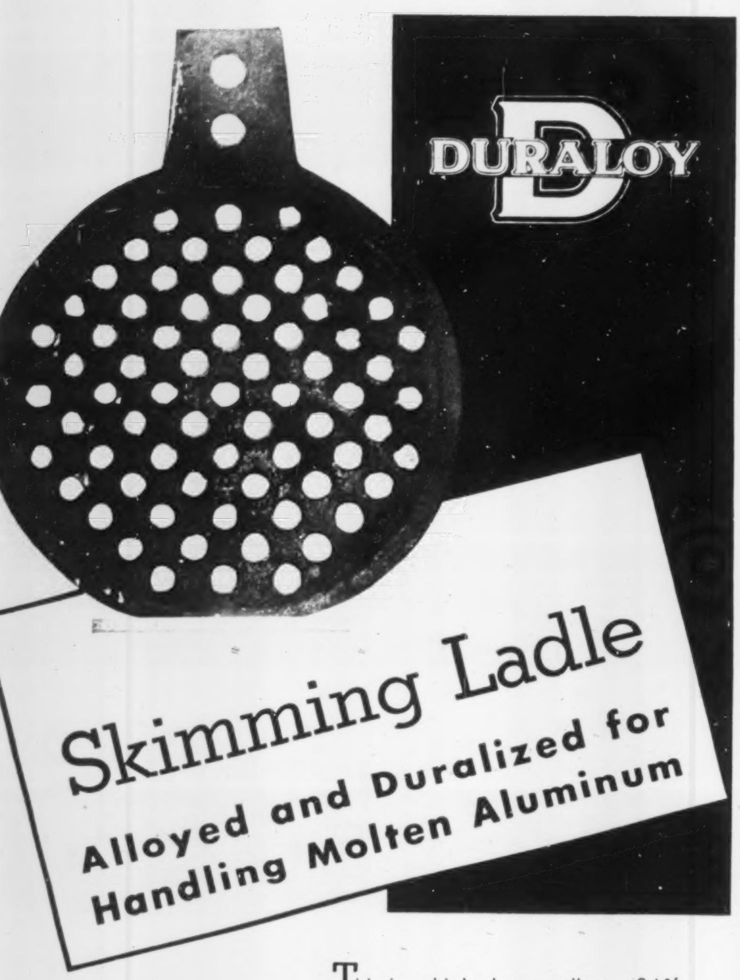
Trained specialists combine their knowledge and talents to produce alloys to exacting standards. Every heat of metal is under skillful metallurgical control from the "idea to the ingot."

If the standard master alloys which we manufacture are not suited to your needs, our research and production departments will work together to produce special alloys which will comply with your specifications. When you buy from Alter Company, YOU CAN BE SURE of unexcelled quality. Any product which bears our name is backed by over fifty years of experience and integrity.

STEEL MILL AND FOUNDRY ALLOYS

Copper Iron 70/30
Copper Iron 90/10
Copper Iron 95/5
Pure Copper Shot
Nickel Copper Shot 50/50
Nickel Copper Shot 70/30
Monel Ingot
Monel Shot
Ferro-Nickel 50/50 Ingot and Shot
Nickel Chrome 70/15 Ingot
Nickel Chrome 60/15 Ingot
Nickel Chrome 35/15 Ingot
Chromium Copper 5%
Chromium Copper 10%

ALTER COMPANY 1700 Rockingham Road, DAVENPORT, IOWA



Skimming Ladle

Alloyed and Duralized for Handling Molten Aluminum

This is a high chrome alloy — 24% chromium and 12% nickel — an excellent alloy for meeting the conditions imposed when handling molten aluminum. As you can see the casting is approximately 6 inches in diameter — not a big casting as many Duraloy products go but indicative of what we can do in the way of small castings.

Our experience in this business of high alloy castings goes back to 1922 and we also pioneered work in the centrifugally cast high alloys which we inaugurated back in 1931. So we have much to offer those requiring chrome-iron, chrome-nickel and nickel-chrome castings. Plenty of experience, skilled metallurgists and foundrymen, modern testing and analytical facilities, and one of the most up-to-date and fully equipped high alloy foundries in the country.

We'll be glad to help (1) in the design of the part you need to produce the strongest casting and (2) to advise in the alloying elements to produce the most durable casting.

THE DURALOY COMPANY

Office and Plant: Scottdale, Pa. • *Eastern Office*: 12 East 41st Street, New York 17, N.Y.
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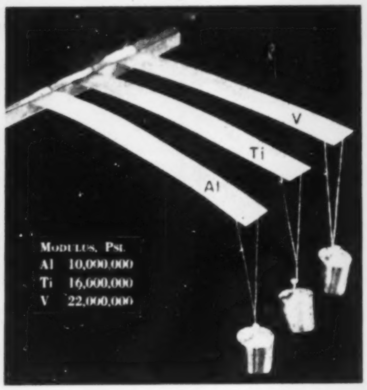
ly high melting point, is strong at temperatures up to 2000°F. Alloys of molybdenum hold promise for being as strong at 2000°F as the present highly alloyed cobalt and nickel base alloys are at 1500°F.

Gas turbine designers continue to call upon the metallurgist to develop stronger materials for use at temperatures above 1500°F.



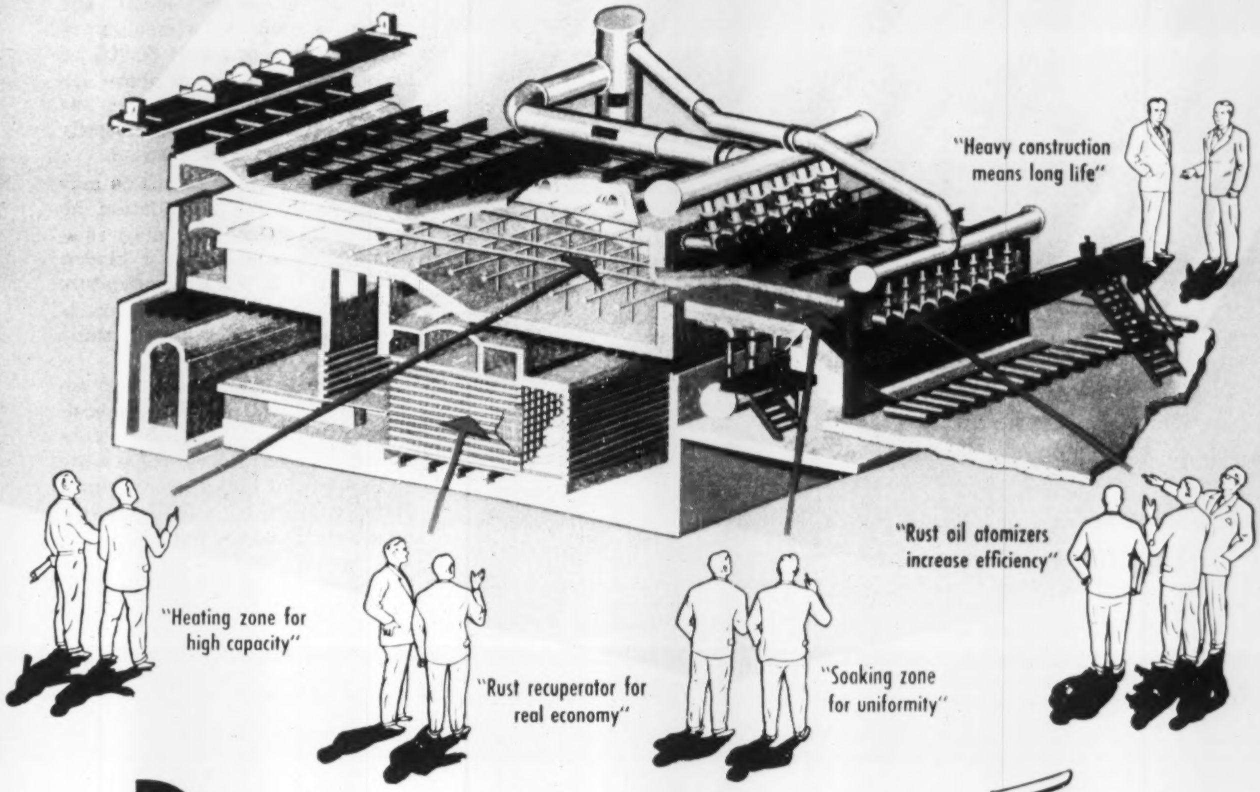
Rigidity comparison among aluminum, titanium and pure vanadium shows a small deflection for the vanadium

Molybdenum-base alloys are a good bet provided one problem unique with them can be licked. They have poor resistance to oxidation. This problem has not yet been solved by alloying. Progress has been made in coating molybdenum base alloys with glasses and ceramics and in siliconizing the surface.

Temperature Rises—New super refractories consisting of sintered combinations of ceramics with metals are under investigation for super high temperature applications. Fabricated by powder metallurgy techniques, they have properties not available in either metals or ceramics alone.

Metal constituent increases thermal conductivity and shock resistance. Ceramic constituent, which has a high melting point and is both nonductile and nonyielding, helps avoid deformation under high stress at high temperatures. It also gives the metal constituent additional protection from oxidation. Potential applications are in

FURNACE MEN KNOW THEY'RE BETTER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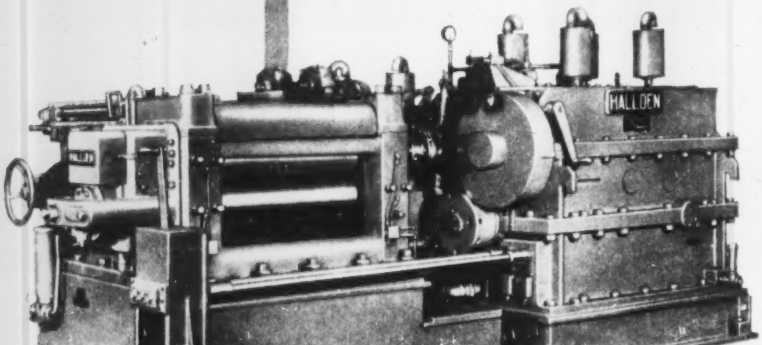

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equipment requiring physical stability above 1800°F.

Metal-ceramic sintered combinations of chromium metal and aluminum oxide have modulus of rupture values of nearly 50,000 psi and tensile strengths of above 35,000 psi at room temperature. At 2000°F tensile strengths of nearly 20,000 psi have been reported.

Titanium carbide compacts may satisfactorily resist oxidation up to 2200°F. One promising composition uses nickel as a binder. Above 1500°F, high temperature strength properties are comparable to or superior to those of many present day alloys.

Promising applications for cemented titanium carbide compositions are nozzle vanes and blades for jet engines, valves, valve seats and guides for high power reciprocating engines, balls for hot hardness testing, anvils for spot welding, inserts for hot die forming, hot extrusion die inserts for light metals and brass, bushings, and flame tubes.

To extend the upper temperature range of materials of construction of this type, metal bonded borides, nitrides, and silicides are being investigated. There is promise that materials having strength up to 3000°F will be developed.

Getting Out of the Rare Class— Lesser known metals such as zirconium, vanadium, and chromium are coming more and more into the picture of improved materials for specific applications. Generally, each has some unusual property that pays the bill.

Zirconium finds its chief use as a material of construction in the atomic energy field. It has a combination of useful properties—excellent corrosion resistance, acceptable mechanical properties and low thermal neutron cross-section (particularly for hafnium-free zirconium).

Ability of zirconium to pass through slow neutrons, thereby conserving them for their primary job of maintaining a chain reaction, is exceeded only by metals which have poor structural characteristics, such as beryllium, lead and bismuth.

Vanadium and chromium have

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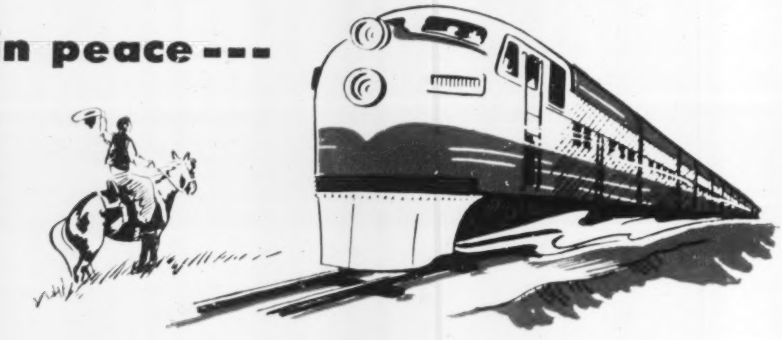
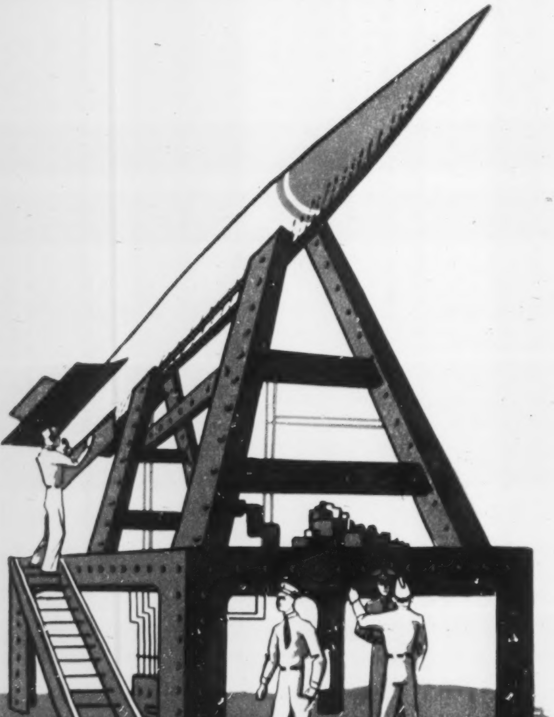


and in the needs of national defense!



The year 1953 marks the 75th anniversary of The Seymour Manufacturing Co. — an industry founded in the reconstruction years following the Civil War but slated for ever-increasing activity in both peace and war.

From a few hundred feet of floor space, and meagre equipment and personnel capable of producing a few thousand pounds of nonferrous alloys in a day, The Seymour Manufacturing Co. has grown to international scope, with several factories, 400,000 feet of floor space and over 800 employees.

While the products of an earlier day went into the limited utilities of that time, those of Seymour today cover a wide bracket of use: In radio and TV equipment, scientific instruments, flatware and zipper metal, electrical devices and appliances, and discs for shell casings, atomic energy and many other war items.

Seymour basic products include:

NICKEL SILVER — an alloy of copper, nickel and zinc, silvery white in color, highly ductile, tough and corrosion-resistant.

PHOSPHOR BRONZE — an alloy of copper, tin and phosphorus. Qualities: high fatigue resistance and corrosion resistance; a "must" in many electrical products.

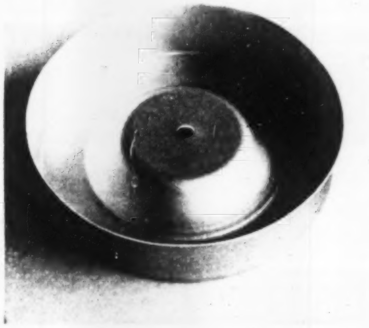
NICKEL ANODES, in all shapes and formulas for modern plating. Also, Anodes of copper, brass and other underplate alloys.

BRIGHT NICKEL, a hot, organic bath, the use of which eliminates the need for coloring and buffing. Glad to send complete information on any product.

SEYMOUR

THE SEYMOUR MANUFACTURING COMPANY
SEYMOUR, CONN.
Nickel Silver • Phosphor Bronze • Nickel Anodes
NONFERROUS ALLOYS SINCE 1878

unusual corrosion-resistant properties. They are being looked at for the intermediate temperature range of 1000°F to 2000°F. Ductile vanadium metal, recently made available, looks good for structural parts where flectural rigidity is the determining factor. It may find application where spring behavior and corrosion resistance are required.



Part made from molybdenum sheet by spinning at about 300°F. Heated tools avoids chilling the work

Futuristic Look — Fortunately, not all investigations are aimed at new materials which must be used today. Many new steels now being developed have future potential value, but are limited in use at the present on account of shortage of strategic alloys.

One new steel, suffering because of the nickel shortage, is a austenitic stainless containing approximately 0.08 per cent carbon, 16 chromium, and 18 nickel. Driving force back of its development was manufacturing difficulties due to rapid hardening of the conventional 18-8 grades.

The new steel has made it possible for the first time to produce nuts by the usual automatic methods on a commercial basis. Recessed head fasteners, which give headaches even in Type 305, can now be readily made. Low degree of work hardening is accompanied by low increase in magnetic permeability under cold deformation. This suggests the new steel for parts which must remain nonmagnetic after severe cold working. Undoubtedly, there are many other

CIRCULAR HEADS WITH TIE RODS
SQUARE HEADS WITH TIE RODS
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NEW T-J Spacemaker AIR CYLINDERS

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- HEAVY DUTY, HI-TENSILE, HARD CHROME PLATED PISTON ROD.

Streamlined construction of the new T-J Cylinders *eliminates tie rods . . . reduces head size . . .* and *saves up to 40% in mounting space!* In addition, a new high in strength is achieved with solid steel heads and heavy wall seamless steel body . . . leakproof construction . . . extra high safety factor.

Cylinder walls are precision honed and hard chrome plated for long-life efficiency. Available with the new T-J Super Cushion Flexible Seals which insure positive cushion with automatic valve action for fast return stroke. Many standard sizes and styles . . . both cushioned and non-cushioned . . . for wide range of pushing, pulling, lifting, clamping or control jobs. T-J dependability. *Fast delivery* to meet rush requirements. Write for bulletin 8152. The Tomkins-Johnson Co., Jackson, Mich.

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ELECTROMET *Data Sheet*

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ALLOYS FOR THE STEEL, IRON, AND NON-FERROUS INDUSTRIES

BORON ALLOYS

PRODUCT*	NOMINAL COMPOSITION	USES
Ferroboron Min. 10.00% Boron Grade	Silicon........max. 1.50% Aluminum.....max. 0.50% Carbon........max. 1.50%	Increases hardenability of steel; also, for additions to malleable iron and aluminum alloys.
Min. 17.50% Boron Grade	Silicon........max. 1.50% Aluminum....max. 0.50% Carbon.......max. 0.50%	
Manganese-Boron	Boron........min. 17.50% Manganese...approx. 75% Silicon........max. 1.50% Carbon..........max. 3% Iron............max. 5%	Used to cleanse and deoxidize non-ferrous alloys.
Nickel-Boron	Boron..........15 to 18% Silicon........max. 1.50% Aluminum.....max. 1.00% Carbon.......max. 0.50% Iron..........max. 3.00% Nickel............Balance	Special boron alloy used principally for deoxidizing nickel and its alloys.
Boron Carbide	Boron..........45 to 50% Carbon ....45 to 50%	Deoxidizer for non-ferrous alloys.
Calcium Boride	Boron..........38 to 42% Calcium........27 to 32% Carbon.........15 to 20%	Welding rod coating.

CALCIUM ALLOYS

PRODUCT*	NOMINAL COMPOSITION	USES
Calcium-Silicon	Calcium........30 to 33% Silicon.........60 to 65% Iron..........1.50 to 3%	Deoxidizer for quality ingot steel. Also used in high-tensile gray irons.
Calcium-Manganese-Silicon	Calcium........16 to 20% Manganese.....14 to 18% Silicon..........53 to 59%	A complex deoxidizer used widely in production of steel castings.
Calcium Metal Regular Grade	Calcium..............98% (Cylinders, Slabs, Cut Pieces, or Turnings)	Reducing agent in metallurgical applications, deoxidizer and degasifier for non-ferrous metals, particularly magnesium.
Distilled Grade	Calcium...approx. 99.90% (Irregular pieces from pea size to 14 in. lumps)	For special applications requiring calcium of very high purity.

CHROMIUM ALLOYS

PRODUCT*	NOMINAL COMPOSITION	USES
Low-Carbon Ferrochrome	Chromium......67 to 71% Silicon......0.30 to 1.00% Carbon (10 Grades) max. 0.03 to max. 2.00%	Production of stainless steels and high-temperature alloys requiring low carbon content.
High-Carbon Ferrochrome Max. 4.50, 5.00, or 6.00% Carbon Grade	Chromium......67 to 70% Silicon......... 1 to 2%	For production of engineering alloy steels and other alloy steels of moderate chromium content.
Max. 7.00% Carbon Grade	Chromium......66 to 69% Silicon......... 1 to 3%	
Min. 7.00% Carbon Grade	Chromium......65 to 68% Silicon......... 1 to 3%	
Nitrogen-Bearing Low-Carbon Ferrochrome	Chromium......67 to 71% Silicon......0.30 to 1.00% Carbon.......max. 0.10% Nitrogen....approx. 0.75%	For additions of nitrogen to improve properties of high-chromium steels.
"SM" Ferrochrome	Chromium......60 to 65% Silicon .... 4 to 6% Carbon......... 4 to 6% Manganese..... 4 to 6%	A high-solubility chromium addition for steel or iron in either furnace or ladle.
Exothermic Ferrochrome	Chromium....60% approx. Carbon.........4.5% max.	An improved exothermic ladle alloy with high solubility, low carbon pickup, and high ignition temperature.
Exothermic Silicon-Chrome	Chromium... 46% approx. Silicon...... 23% approx. Carbon.......1.00% max.	An improved exothermic ladle alloy with high solubility, very low carbon pickup, and high ignition temperature.

CHROMIUM ALLOYS cont.

PRODUCT*	NOMINAL COMPOSITION	USES
Foundry Ferrochrome High-Carbon Grade	Chromium......62 to 66% Silicon......... 7 to 10% Carbon......... 5 to 7%	Developed especially for high-solubility ladle additions of chromium to improve composition and properties of cast iron.
Low-Carbon Grade	Chromium......50 to 54% Silicon.........28 to 32% Carbon.......max. 1.25%	
Chromium Metal Low-Carbon Grades	Chromium.......min. 97% Carbon ......max. 0.10% and 0.50% Iron............max. 1%	Production of wide variety of non-ferrous chromium-bearing alloys, including electrical resistance alloys and high-temperature alloys.
High-Carbon Grade	Chromium......87 to 90% Carbon......... 9 to 11% Iron.........max. 1.25%	
"EM" Ferrochrome-Silicon No. 1 Grade	Chromium......39 to 41% Silicon.........42 to 46% Carbon.......max. 0.05%	In production of stainless steels, these alloys are used to reduce metal oxides from the slag back into bath.
No. 2 Grade	Chromium......36 to 39% Silicon.........36 to 39% Carbon.......max. 0.05% Aluminum...... 7 to 9%	
"EM" Ferrosilicon-Chrome	Chromium......50 to 54% Silicon.........28 to 32% Carbon.......max. 1.25%	For adding chromium and silicon to steels containing up to 1 or 2 per cent chromium.
"EM" Chromium Briquets (Hexagonal Shape)	Chromium...........2 lb. Total Weight.......3⅛ lb.	For adding chromium to cast iron in the cupola.

COLUMBIUM ALLOYS

PRODUCT*	NOMINAL COMPOSITION	USES
Ferrocolumbium	Columbium.....50 to 60% Silicon..........max. 8% Carbon.......max. 0.40%	Stabilizer in austenitic chromium-nickel stainless steels. Also constituent of high-temperature alloys.
Ferrotantalum-Columbium	Columbium...approx. 40% Tantalum.....approx. 20% Cb + Ta ....min. 60% Silicon...........4 to 6% Carbon.......max. 0.30%	Another stabilizer, used to supplement ferrocolumbium, in austenitic chromium-nickel stainless steels. Also used in high-temperature alloys.

MANGANESE ALLOYS

PRODUCT*	NOMINAL COMPOSITION	USES
Standard Ferromanganese Regular Grade	Manganese.....78 to 82% Carbon........approx. 7% Silicon..........max. 1%	Most common means of adding manganese to steel for both alloying and deoxidizing purposes. Also for counteracting sulphur in steel and cast iron.
Low-Phosphorus Grade	Manganese.....78 to 82% Carbon..........max. 7% Silicon..........max. 2% Phosphorus...max. 0.10%	
Low-Carbon Ferromanganese Low-Phosphorus Grade	Manganese......min. 90% Carbon........max. 0.07% Phosphorus...max. 0.06%	Additions of manganese to steels of low-carbon specification, particularly stainless steels of 18 per cent chromium, 8 per cent nickel type.
Regular Grades	Manganese.....85 to 90% Carbon ....max. 0.07, 0.11 to 0.15, 0.30, or 0.50%	
Regular Grade (High-Silicon)	Manganese.....80 to 85% Carbon.......max. 0.75% Silicon......... 5 to 7%	
Medium-Carbon Ferromanganese	Manganese.....80 to 85% Carbon.........max. 1.25 to 1.50%	For making low- and medium-carbon manganese steel and Hadfield steel.
Silicomanganese Max. 1.50% Carbon Grade	Manganese.....65 to 68% Silicon.........18 to 20%	A versatile alloy useful as furnace block, deoxidizer, and also for making manganese additions to steel in the ladle or in the furnace.
Max. 2.00% Carbon Grade	Manganese.....65 to 68% Silicon......15 to 17.50%	
Max. 3.00% Carbon Grade	Manganese.....65 to 68% Silicon.......12 to 14.50%	

*All of the alloys and metals listed are produced in the usual lump, crushed, or ground sizes, except where other special forms are indicated.

MANGANESE ALLOYS cont.

PRODUCT*	NOMINAL COMPOSITION	USES
Low-Iron Ferromanganese	Manganese.....85 to 90% Carbon.....approx. 7.00% Silicon...........max. 3% Iron.............max. 2%	For high manganese additions to certain non-ferrous alloys, particularly aluminum.
Manganese Metal	Manganese......min. 96% Carbon.......max. 0.20% Silicon........max. 1.00% Iron..........max. 2.50%	Used both as deoxidizer and alloy in production of numerous non-ferrous metals and alloys.
"EM" Silicomanganese Briquets (Square Shape)	Manganese...........2 lb. Silicon..............½ lb. Total Weight.......3½ lb.	For adding manganese (with silicon) to cast iron in the cupola.
"EM" Ferromanganese Briquets (Oblong Shape)	Manganese..........2 lb. Total Weight.........3 lb.	For adding manganese (without silicon) to cast iron in the cupola.

SILICON ALLOYS

PRODUCT*	NOMINAL COMPOSITION	USES
50% Ferrosilicon		
Regular Grade	Silicon.........47 to 51%	Deoxidizer for most grades of killed or semi-killed steel. Blocking grade specially sized for maximum efficiency.
Blocking Grade	Silicon........47 to 51%	
Low-Aluminum Grade	Silicon.........47 to 51% Aluminum.....max. 0.40%	
65% Ferrosilicon		
Regular Grade	Silicon.........65 to 70%	For furnace or ladle addition to carbon and alloy steels.
Low-Aluminum Grade	Silicon....61.50 to 66.50% Aluminum.....max. 0.50%	Mainly for production of electrical sheet steel.
75% Ferrosilicon		Deoxidizer and alloy for production of high-silicon spring and electrical sheet steel. Graphitizing inoculant for cast iron.
Regular Grade	Silicon.........73 to 78%	
Low-Aluminum Grade	Silicon..........73 to 78% Aluminum.....max. 0.50%	
85% Ferrosilicon		Enables melter to add higher percentages of silicon without chilling metal in ladle. Graphitizing inoculant for cast iron.
Regular Grade	Silicon.........83 to 88%	
Low-Aluminum Grade	Silicon.........83 to 88% Aluminum.....max. 0.50%	
90% Ferrosilicon		
Regular Grade	Silicon.........92 to 95%	Permits large additions of silicon without harmful chilling effect.
Low-Aluminum Grade	Silicon.........92 to 95% Aluminum.....max. 0.50%	
Silicon Metal		Additions of silicon to non-ferrous metals, particularly aluminum and copper, to improve physical properties.
Regular Grade	Silicon.....min. 97 or 96% Iron........max. 1 or 2%	
Purified Grade	Silicon....99.70 to 99.90% Iron.........005 to .015%	For applications in non-ferrous industry requiring silicon of high purity.
Low-Calcium Grade	Silicon..........min. 97% Iron.............max. 1% Calcium.......max. 0.10%	For the production of high-silicon aluminum alloys where calcium is detrimental.
Low-Aluminum Grade	Silicon..........min. 98% Iron.............max. 1% Aluminum.....max. 0.10%	For the production of silicon-copper alloys where aluminum is detrimental.
"SMZ" Alloy	Silicon.........60 to 65% Manganese..... 5 to 7% Zirconium...... 5 to 7%	Particularly strong graphitizing inoculant used in making ladle additions to cast iron.
Special Graphitizer	Ferrosilicon Compound	Deoxidizer and graphitizer for cast iron.
Magnesium-Ferrosilicon	Silicon.... ..approx. 46% Magnesium..approx. 8.5%	For ladle addition to cast iron to obtain special properties.
Barium-Silicon	Barium.........40 to 50% Silicon.........45 to 55%	For deoxidation of non-ferrous alloys.
"EM" Silicon Briquets (Cylindrical Shape)		
Large Size	Silicon..............2 lb. Total Weight.........5 lb.	For adding silicon to cast iron in the cupola.
Small Size	Silicon..............1 lb. Total Weight........2½ lb.	

"Electromet," "EM," "SM," and "SMZ," are trade-marks of Union Carbide and Carbon Corporation.

TITANIUM ALLOYS

PRODUCT*	NOMINAL COMPOSITION	USES
Ferrotitanium	Titanium......27 to 32% Carbon .....max. 0.10%	For stabilized austenitic stainless steels and high-temperature metals.
Silicon-Titanium	Titanium.......40 to 50% Silicon.........45 to 50% Iron.............max. 3%	For additions of titanium to steels or non-ferrous alloys.
Manganese-Nickel-Titanium	Titanium.......43 to 48% Nickel.......approx. 25% Manganese......max. 8%	Deoxidization of nickel alloys.

TUNGSTEN ALLOYS

PRODUCT*	NOMINAL COMPOSITION	USES
Ferrotungsten	Conforming to A.S.T.M. Spec. A 144-39	For production of tool and die steels; also high-temperature alloys.
Tungsten Metal Powder		
Melting Grade	Tungsten.....min. 98.80% Total Carbon..max. 0.25%	Production of tungsten steels and cast tungsten carbide.
Calcium Tungstate	Tungstic Oxide..68 to 72%	For making tungsten chemicals and other tungsten products.
Calcium Tungstate Nuggets	Tungstic Oxide..68 to 72%	Making tool steels and high-temperature alloys by direct reduction.
Ammonium Paratungstate	Tungstic Oxide.min. 88.7%	Intermediate for tungsten products.

VANADIUM ALLOYS

PRODUCT*	NOMINAL COMPOSITION	USES
Ferrovanadium	Vanadium......50 to 55% Carbon....max 0.20, 0.50, or 3.00% Silicon....max. 1.50, 2.00, or 8%	Production of tool and engineering steels, high-strength structural steels, non-aging rimming steels, and wear-resistant irons.
Vanadium Oxide Fused	V_2O_5...........86 to 89% Na_2O........approx. 10% CaO..........approx. 2%	For addition of vanadium to steel and for manufacturing catalysts.
Sodium Polyvanadate (Red Cake)	V_2O_5.........approx. 85% Na_2O.........approx. 9% CaO..........approx. 2% H_2O.........approx. 2.5%	For manufacture of vanadium compounds, including vanadium catalysts.
High-Purity	V_2O_5......approx. 99.50%	
Ammonium Metavanadate	NH_4VO_3.........min. 99%	

ZIRCONIUM ALLOYS

PRODUCT*	NOMINAL COMPOSITION	USES
12 to 15% Zirconium Alloy	Zirconium......12 to 15% Silicon.........39 to 43% Carbon........max. 0.20%	This is a powerful deoxidizer. It also increases depth of hardening.
35 to 40% Zirconium Alloy	Zirconium......35 to 40% Silicon.........47 to 52% Carbon.......max. 0.50%	Deoxidizer for fine grades of alloy steels. Used for adding larger amounts of zirconium.
Nickel-Zirconium	Zirconium......25 to 30% Nickel..........40 to 50%	For deoxidizing and degasifying nickel alloys.

IF YOU HAVE A METALS PROBLEM

More than 50 different alloys and metals are produced by ELECTROMET in hundreds of varying compositions and sizes. If you need help in selecting the proper alloys, or have some specific metallurgical problem, be sure to consult one of ELECTROMET'S specially trained metallurgists and engineers. Address your inquiries to one of the offices listed below.

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Detroit 2, Mich...........6-240 General Motors Building
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☐ Flexible Shaft
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☐ Fuse
☐ Glass Netting
☐ Hair Pin
☐ Holly
☐ Hook & Eye
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☐ Piano Covering
☐ Picture Cord
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☐ Piston Ring
☐ Plow Steel
☐ Reed
☐ Rope
☐ Safety Pin
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☐ Stapling
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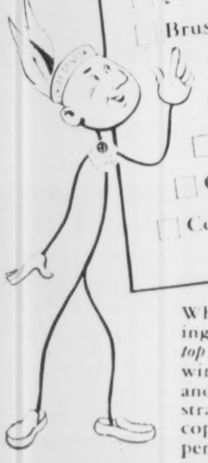
☐ Weaving



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applications just around the corner for this type of stainless in severely formed parts.

Even More Futuristic—Looking even further into the future is the metallurgist working with radioisotopes. He has found the by-products of the atomic pile, socalled radioactive tracers, a useful tool in fundamental metallurgical investigations.

In the process field, radioactive iron and calcium have been used to study reactions between molten iron and slags. Radioactive calcium makes it possible to determine solubility of calcium in iron.

Radioactive tracers are used to study diffusion mechanisms in oxide films as applied to the practical aspects of scaling of metals. This approach is being made to investigations on the kinetics of reactions in solid metals involving diffusion, oxidation and corrosion processes and mechanism of austenite-reaction. Investigations such as these form the basis of an understanding of such practical operations as heat treatment of steels, age hardening, recrystallization, and oxidation of metals.

Readaptation of old materials is also markedly affecting product design and manufacture.

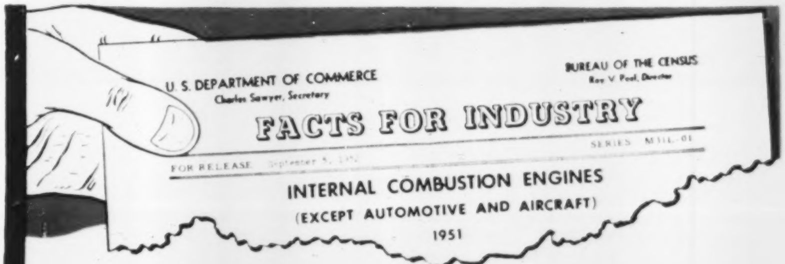
Higher Strength—A new high strength aluminum alloy, temporarily designated as XA78S, was made available during the past year to airplane builders for experimental and controlled production use. This alloy is 10 per cent higher in tensile and yield strengths than Alcoa 75S. It has about the same elongation and fatigue properties as 75S. So far, use of XA78S has been confined to production of extrusions, sheet and plate, both bare and clad.

A general purpose aluminum tube of alloy B50S-O was offered for the first time last year. It is suitable for use in oil, gasoline and lubricating lines to engines; fuel lines to heaters; and air, hydraulic, and vacuum lines to brakes and instruments.

Magnesium Loosens Up—Magnesium supply was tight a year ago but is now catching up to where metal is again available for commercial uses in all forms.

Highest strength magnesium ex-

Latest Census Report Provides Proof of Overwhelming Preference for WISCONSIN HEAVY-DUTY *Air-Cooled* ENGINES



U. S. DEPARTMENT OF COMMERCE
Charles Sawyer, Secretary

BUREAU OF THE CENSUS
Roy V. Peel, Director

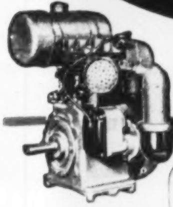
FACTS FOR INDUSTRY

SERIES M11L-01

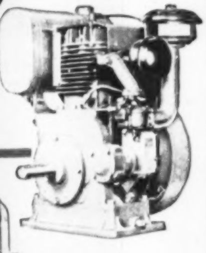
FOR RELEASE September 5, 1952

INTERNAL COMBUSTION ENGINES
(EXCEPT AUTOMOTIVE AND AIRCRAFT)
1951

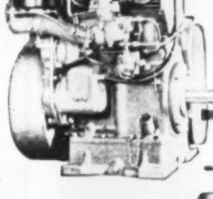
50.61% of Aggregate Total, 3 to 40 H. P. Engines made in 1950-'51 were WISCONSINS



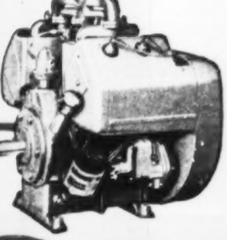
Models ABN, AKN, AEN
Single cylinder engines 3 to 8½ hp.



Models AFH, AGH, AHH — single cylinder engines 6 to 9 hp.



Models TE and TF
2-cylinder engines 7 to 14½ hp.



Models VE4, VF4, VP4D, VG4D —
V-type 4-cylinder engines 15 to 36 hp.

It is no idle boast when Wisconsin Motor Corporation is referred to as "No. 1 Source" for Heavy-Duty Air-Cooled Engines. Overwhelming verification of this statement is established through statistics presented in a Bureau of the Census report, released on Sept. 5, 1952, covering the production of all types of internal combustion engines (except aircraft and automotive).

Based on figures contained in this report, 50.61% (1950-'51 average) of all engines produced within an 11 to 175 cu. in. displ. range (approx. 3 to 40 hp.) were Wisconsin Air-Cooled Engines, exclusive of outboard marine and so-called "captive" engines built by various manufacturers for use on their own original equipment.

Here is positive *proof of preference* for Wisconsin Air-Cooled Engines by builders and users of power-operated equipment in all fields where dependable, heavy-duty engine service is required. These engines have been *pre-judged* and *pre-selected* by more power-wise purchasers than all other makes of engines combined, within their power range!

This universal preference is based on such factors as ideal adaptability of Wisconsin Engines to fit both the machine and the job; easy starting and trouble-free air-cooling under all weather and climatic conditions; low-cost maintenance; ready availability of factory-trained servicing and original replacement parts . . . plus *outstanding performance.*

It will pay you to specify "Wisconsin Power" for your equipment. Complete descriptive and engineering data on request.

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WISCONSIN MOTOR CORPORATION

World's Largest Builders of Heavy-Duty Air-Cooled Engines

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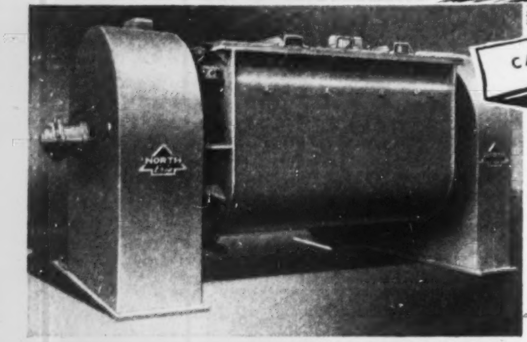

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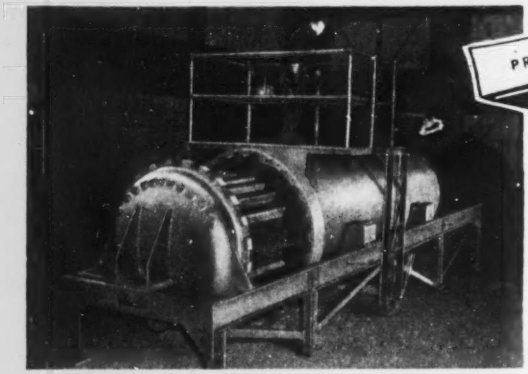

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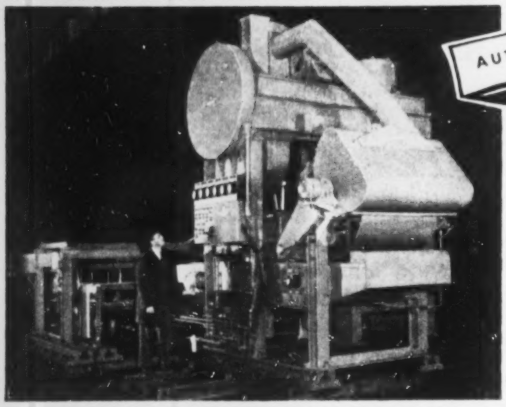

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complete engineering data available on request

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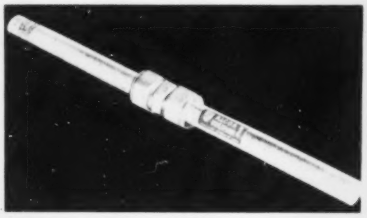
ENGINEERING CONTRACTORS DESIGNERS AND SUPPLIERS
SPECIAL PURPOSE MACHINERY AND EQUIPMENT FOR THE BASIC INDUSTRIES

trusion material is the ZK60 (Mg-6 per cent ZN-0.7 Zr) alloy, which shows good press forgeability and improved toughness.

Do Not Creep—Magnesium-rare earth-zirconium alloys have advanced to the head of the class in the casting field for applications at elevated temperatures. Latest addition to this group, now in initial production and prototype engine evaluation, is HK31 (Mg-3 per cent thorium-0.6 Zr) alloy. This composition gives improved creep resistance in jet engines in the use range above 500°F.



This general purpose aluminum tube of alloy B50S-O is suitable for oil, gasoline and engine lubricating lines

Makes the Grade—Use of nodular iron in engine parts increased during the year. One application was for small engine crankshafts. It already has passed a rigid test in at least one company. No serious failures have shown up for compressor bodies and heads which have been in service for a sufficiently long time to show up such things.

Progress is being made in production of nodular iron. Heat after heat of it is now being poured which conforms to the desired physical properties. Recent work on the use of small quantities of cerium to overcome the influence of detrimental elements promises to be important in that it will allow the use of pig irons previously tabooed because of high titanium.

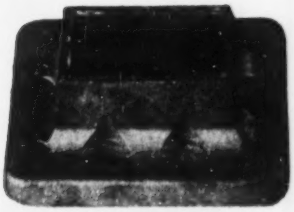
A number of specifications are now available covering nodular iron. A.S.T.M. A339-51T is a standard that can be effectively used.

Growing Too — Powder metallurgy with particular reference to finished bearings and finished machine parts moved forward during 1952. This was manifested by an

Shell mold and bronze casting
by Walworth Co., New York 17, N. Y.

SHELL MOLDING

And Mass Production



If your plant is set up for long run production, be sure to ask your foundryman about the shell molding process before you design ferrous or non-ferrous metal parts. Here are some of the advantages you may gain from this improved foundry technique:

- **Metal castings have almost pattern-smooth surfaces.**
- **Pieces are cast to closer finished dimensions — tolerances as close as .003 to .005 inches per inch.**
- **Higher percentage of sound, uniform castings cuts down on rejects.**
- **Metal castings require less machining, reducing production costs.**

The outstanding feature of shell molding is its use of thin-shell, lightweight sand molds bonded with BAKELITE Phenolic Resins. It may pay you to learn more about this process. Consult your foundryman. Or, if you have a foundry department, write Dept. OM-49 for booklet C-8, which describes shell molding and the BAKELITE Phenolic Resins developed expressly for it.

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increased volume of production and a broader range of products.

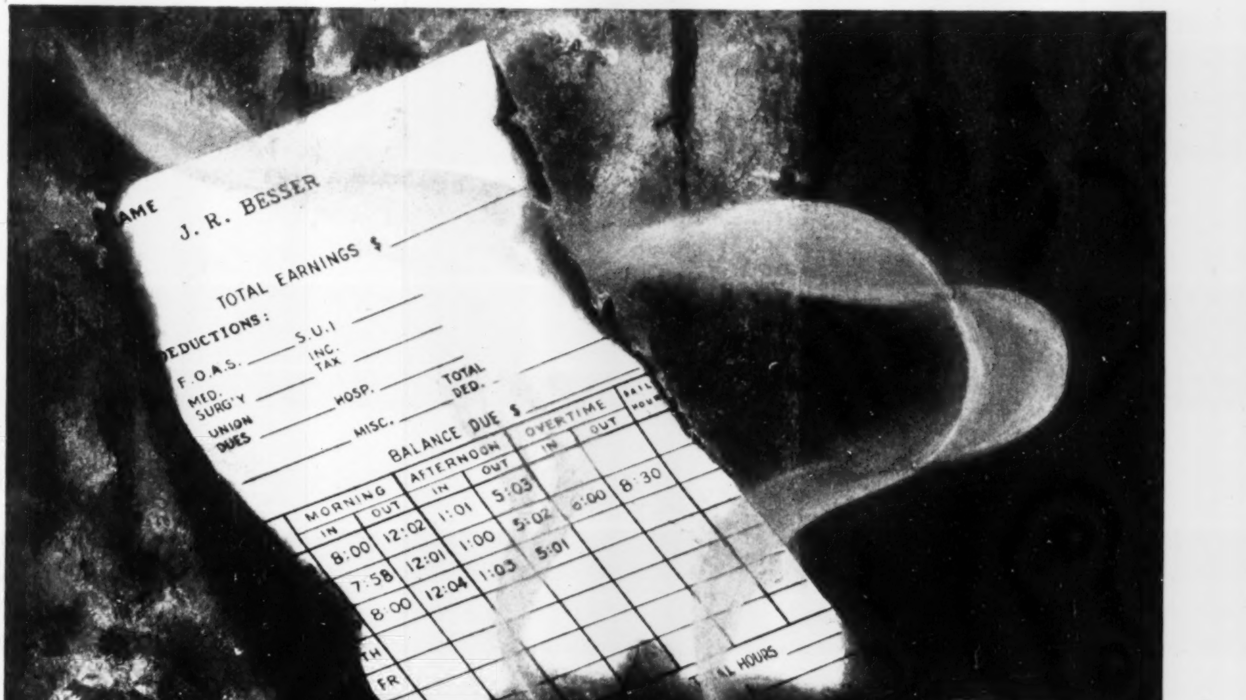
Without question, the largest expansion and volume is occurring in powder products of ferrous base. Whereas, this applies to both bearings and finished machine parts, the latter is forging more and more into the foreground. 1953 will see an increased demand for ferrous-base parts in larger size units, with more rigid requirements along lines of heat and corrosion resistance.

In 1951, American manufacturers produced roughly 600,000 pounds per month of ferrous metal powders. This quantity was augmented in 1952 with the preponderance of our requirements being imported from Europe. Early in 1953, American manufacturers, primarily by means of new plants now being completed, will have a capacity of 10,000,000 pounds per month. One such plant alone will produce 5,000,000 pounds per month. These developments are a barometer of the interest in machine parts of iron powder.

Builders of presses, too, have been active. Improvements include greater strength, sturdiness, flexibility, and provision for rapid and easy setup.

Beryllium Products — Use of beryllium products for 1952 exceeded that of any previous year. Pressure and investment castings led the parade. Beryllium copper pressure castings are used for rubber and plastic molds and zinc die casting dies, as well as certain mechanical parts requiring a dense structure and intricate detail without machining. Beryllium copper investment castings are used in instruments, machinery, firearms and aircraft accessories.

In the development stage are several new copper alloys of low beryllium content which offer almost the same strength as the standard alloys but with increased formability and at lower cost. One of these recently became available in the form of beryllium copper tubing and is being used in bourdon tube applications. Ternary copper alloys, with beryllium content substantially reduced, appear promising for a number of applications.


NAME J. R. BESSER
TOTAL EARNINGS $
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S.U.I.
MED. SURG'Y
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At locations where a deep-seated, smoldering internal fire as well as a fast burning external fire might occur, the smoke detector of a C-O-TWO Smoke Fire Detecting System, based on an exclusive operating principle, automatically detects the first trace of smoke, smoldering or fire.

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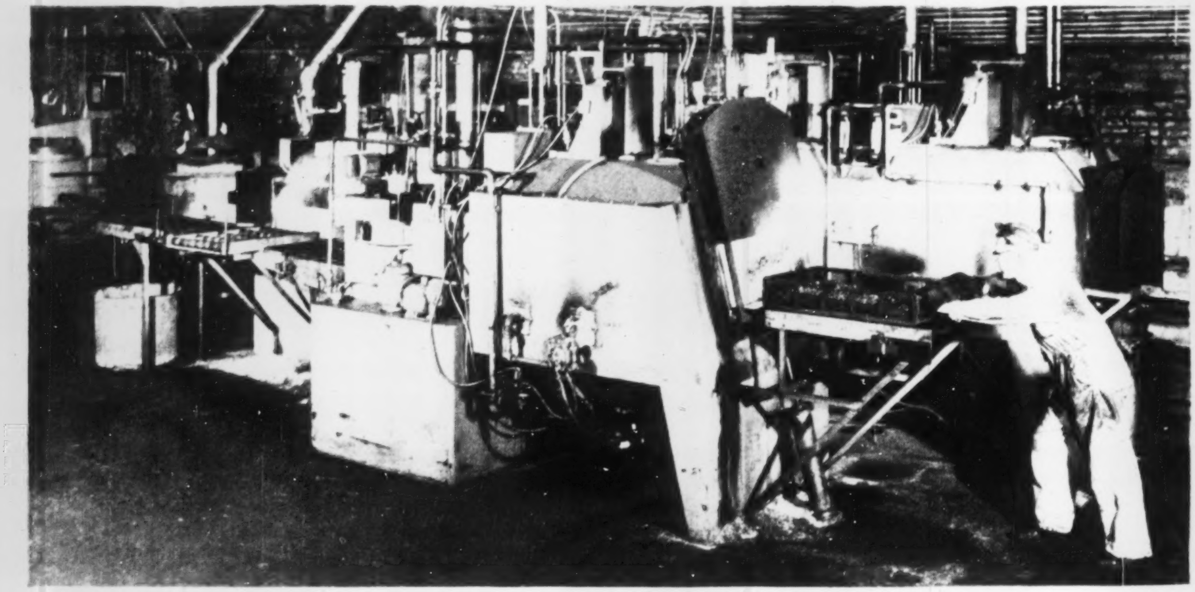


This Ipsen unit automatically handles a variety of parts in straight hardening, carbonitriding, carburizing and martempering through quench or cooling

FORUM ON TECHNICAL PROGRESS

With today's equipment and control, production men are turning out carburized or heat treated parts having necessary properties to meet any engineering requirement

HEAT TREATMENT is meeting the challenge of the times on all counts.

In carburizing, carbonitriding and salt bath hardening automatic control and mechanization marches on. Continuous equipment, full or semi-automatic, is giving top economy in large scale production.

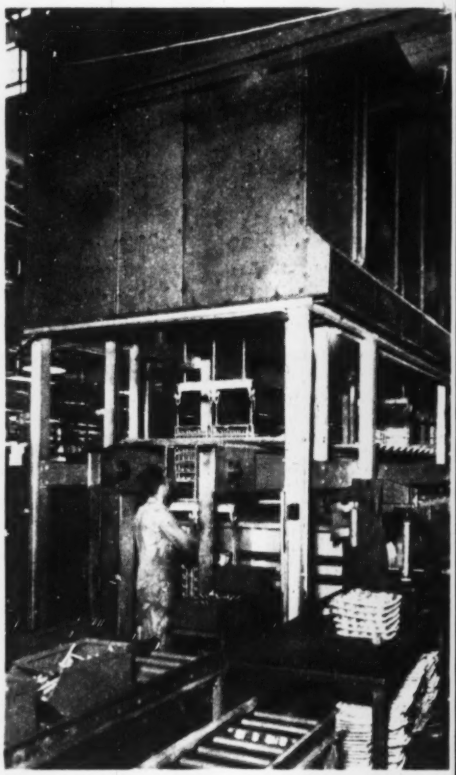
Refinements in gas generating equipment coupled with continuous control to provide the atmosphere required for any degree of carburization led the parade of new developments.

Decreased alloying elements in heat treatable steels made it necessary to extend the use of superquench oils and expanded carbonitriding to increase hardenability. Jet engine parts increased use of high temperature heat treatment.

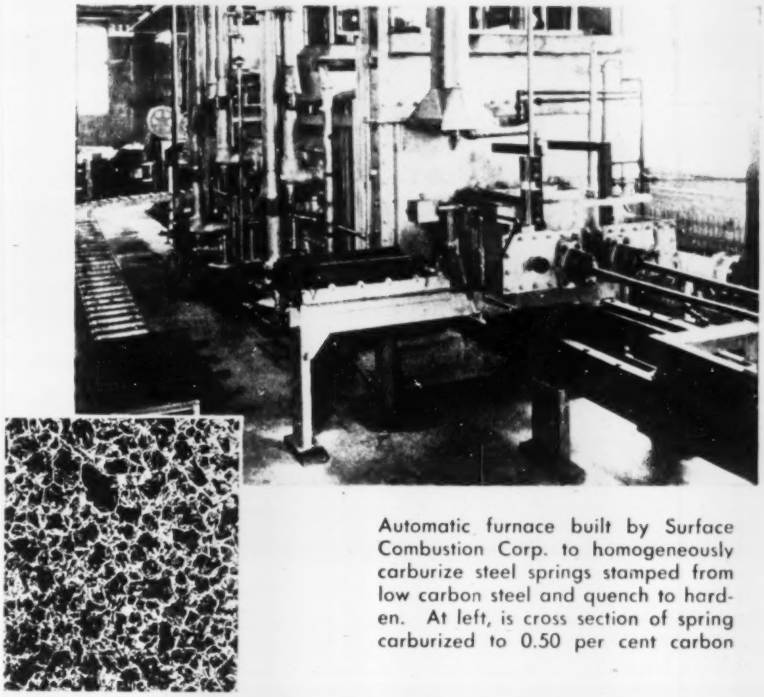
Methods for suspended carburization are now used to hold work in process for many hours without significant changes in case conditions. Past year has seen increased use of carbon restoration equipment and facilities to control surface decarburization. This was particularly evident in the bolt industry.

Hot oil or salt quenching baths, in conjunction with batch or continuous equipment stay in the picture because of reduction in distortion and improved physical properties.

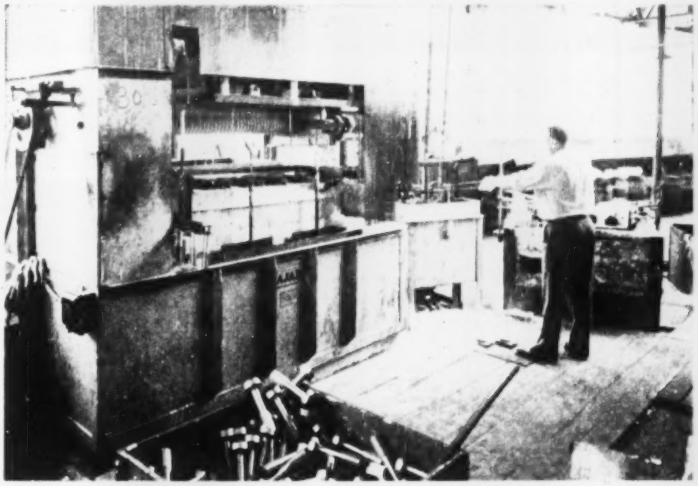
Induction hardening continues to prove its worth for local hardening of parts. It helps in the production of shell hardened axle shafts made from straight carbon steel. Steel cartridge cases are induction



Mechanized Ajax salt bath furnace for carburizing refrigerator compressor parts. One operator does the job



Automatic furnace built by Surface Combustion Corp. to homogeneously carburize steel springs stamped from low carbon steel and quench to harden. At left, is cross section of spring carburized to 0.50 per cent carbon



Heat treating automotive spline shafts in a neutral salt bath using a screw conveyor. Operator is oil quenching part just removed from furnace

heat treated after cold forming to increase their strength in selected areas.

Research on the effect of alloying elements and heat treatment on the low temperature impact properties of steels showed that alloying elements have little effect on transition temperature.

Many of the advantages which have been attained in recent years by rapid cycle annealing with large continuous type furnaces are now available to the smaller manufacturing shop through the introduction of pit type furnaces capable of reproducing the required heating and cooling rates in a batch load under a protective atmosphere.

Recognition that the undesirable "white layer" can be eliminated from a nitrided steel case on steel parts by the use of a high degree of dissociation in the furnace atmosphere during the latter portion of the nitriding cycle resulted last year in the addition of an auxiliary ammonia dissociating unit to many of the nitriding furnaces already installed. Looks like this may develop into a universal practice.

Boron Helps—Experience gained by manufacturer and user alike has resolved many of the problems inherent in heat treatment of boron steels.

Boron steels have been tested sufficiently to indicate that in many cases they can replace more highly alloyed materials. Limitations have appeared in carburizing applications. Most important question is the influence of boron in the higher carbon levels of the case of carburized parts.

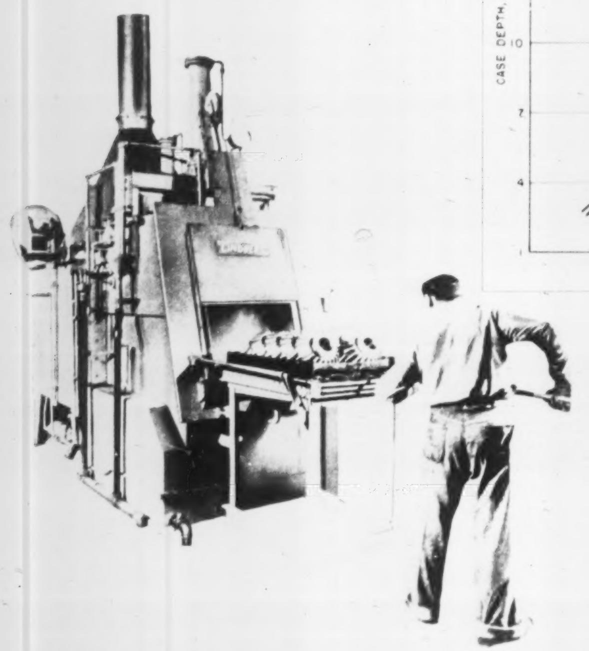
Carbon Figures In—Tests conducted with the new General Motors trapezoidal end-quench bar, developed specifically for measuring the hardenability of carburized steels, showed that the case hardenability of boron steel (81B17) reached a maximum at about 0.70 per cent carbon. Significant decreases were observed at concentrations in excess of this amount. Another boron investigation which employed a number of different heat treatments to evaluate the case hardenability of 80B20, 94BV20, 94B20 and 47B20 over the range of carbon contents between 0.60 and 1.0 per cent, showed that the hardenability decreased with increase in carbon content.

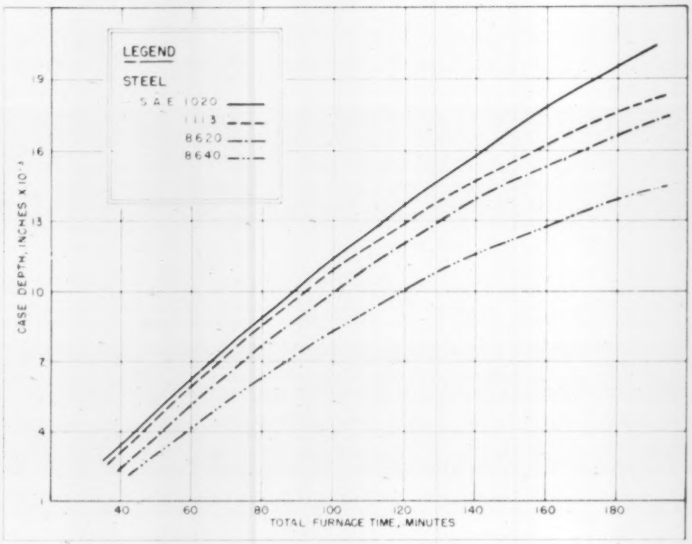
At International Harvester Co., boron steels gave trouble in case-hardened gears. Principal reason was that boron had a great effect on the hardenability of low-carbon steels corresponding to the core and, little if any, effect on the hardenability of the 0.90 per cent carbon zone in the outer portion of the case.

This sometimes gave distortion and in a few cases there was a lack of sufficient hardness in the case portion of large gears and pinions. On the other hand, boron was effective in increasing the hardness in the lower layers of the case where the carbon content was about 0.40 to 0.70 per cent.

Problems Licked—Initially, Harvester used boron steels to replace standard alloy steels on the basis of equivalent hardenability. Plant results showed that aside from the

Gas-fired, vertical radiant tube carbonitriding furnace for case hardening production runs of a variety of low carbon steel parts. Chart indicates case depth for 375 lb load at 1600°F





addition of boron, certain heat treatment problems came about as a result of changes in the alloy content of the steel, especially where the nickel content was lowered or eliminated.

For gear parts made of chromium-molybdenum steels (modified 4100 series), the change to chromium-boron steels did not open up new problems. Heat treatment practices were essentially unchanged. International Harvester is now using 50B00 series chromium boron steels in large volume production in carbon contents of from 0.15 to 0.60 per cent. Steels previously used were 4800, 4600, 8600 series.

New Fields—Salt bath heat treating not only kept pace with other heat treating methods, but edged into entirely new fields. At top of the list are steel mill installations for heating alloy and stainless steel billets for the manufacture of tubing and shapes by the extrusion process.

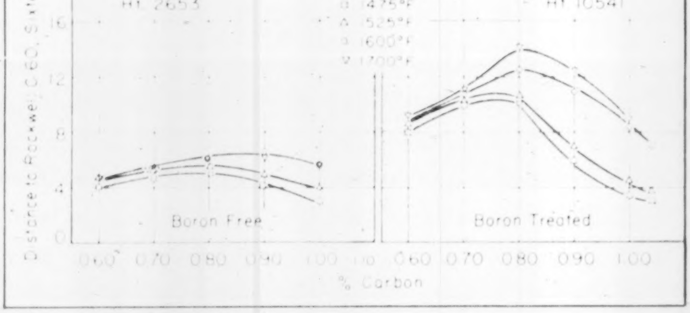
Choice of salt baths for this operation was their ability to heat billets rapidly and uniformly to the extrusion temperature of 2300°F without formation of any scale on the surface. Excessive grain growth cannot be tolerated because a coarse grain structure affects the ease of extruding. For that reason, rapid heating in salt baths not only lengthens die life but permits use of smaller extrusion presses.

While some attempts were made in former years to utilize salt baths for heating steel blanks for forging, the first large production installations were made in 1952.

One installation involves heating of blanks for forging high explosive shells. Auto manufacturers use salt baths for heating alloy steel plates for forging.

Development of the submerged electrode type salt bath furnace has been a boost to these new large scale high temperature operations. Electrode life is now measured in months rather than days.

For the Military—In the defense



Case hardenability of boron free and boron treated steels carburized and reheated to four hardening temperatures at Timken Roller Bearing

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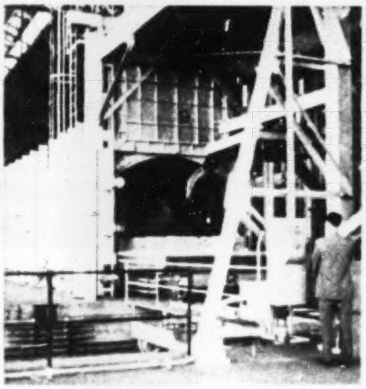
may we have the opportunity of studying your requirements and submitting our recommendations

LEWIS FOUNDRY AND MACHINE DIVISION OF BLAW-KNOX CO., PITTSBURGH, PA.

program, salt baths continue to play a major role in the heat treatment of armament and aircraft components. In manufacture of high explosive shells by the cold extrusion process, salt baths are used for the annealing operations between extrusion steps.

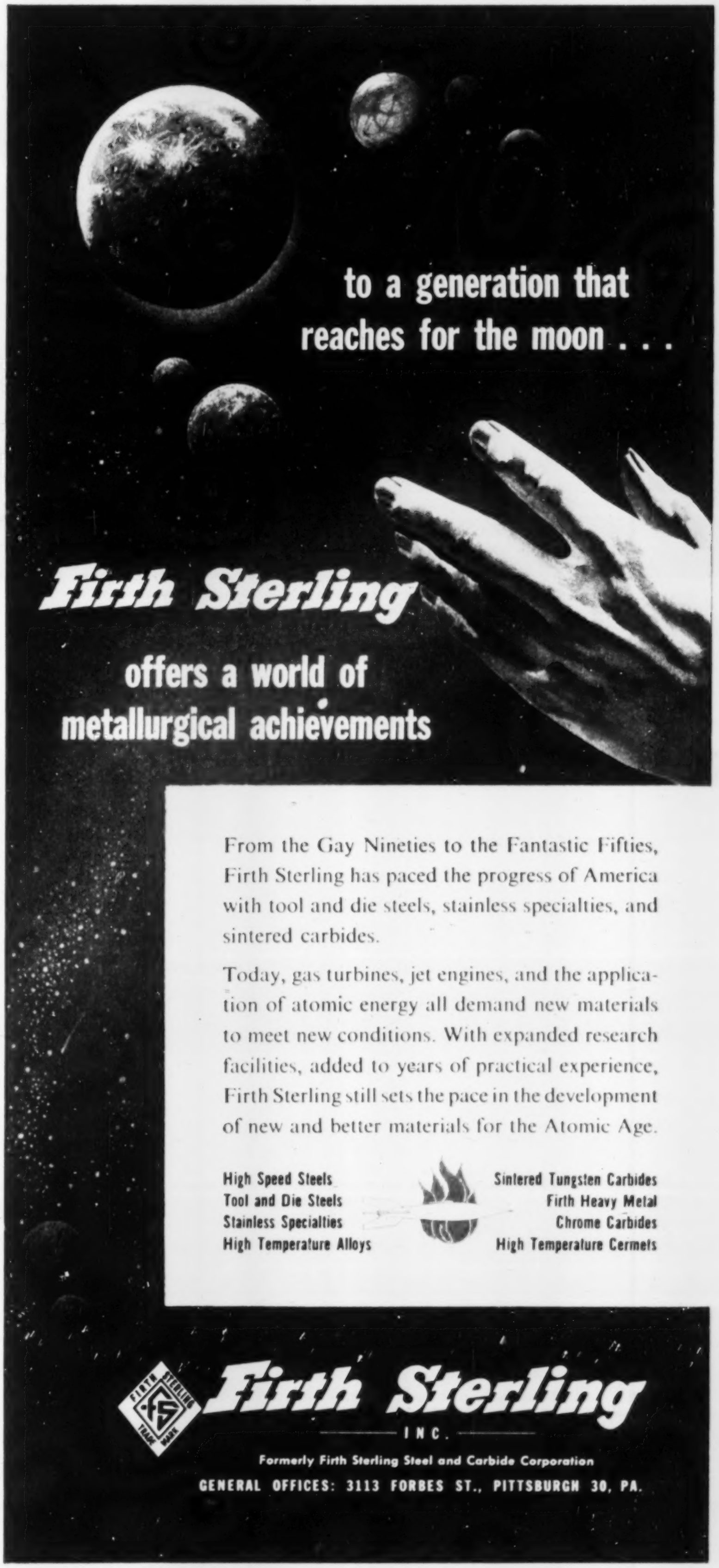
Ballistic requirements of new armor piercing shot are more severe than in World War II. Armor piercing shot contractors have resorted to martempering these highly alloyed steels in order to avoid any danger of cracking and at the same time develop the high hardness pattern required. Extreme hardness requirements make it practically impossible to machine and grind after heat treatment, so that the control of distortion afforded by martempering is of special value.


Continuous heat treating furnace built by Selas Corp. of America for the production of tank hulls and turrets

Salt baths are being used by the aircraft industry in the solution heat treatment of aluminum alloys, and in neutral hardening of landing gear, air frame and engine components.

Tank manufacturers are utilizing salt baths for carburizing, martempering and hardening many items such as gears, shafts, engine parts and gun mounts. Interest is increasing in salt baths for austempering - martempering versus conventional quenching.

Gas Producer — Important step in gas carburizing was the development of a generator capable of producing a gas of controlled composition.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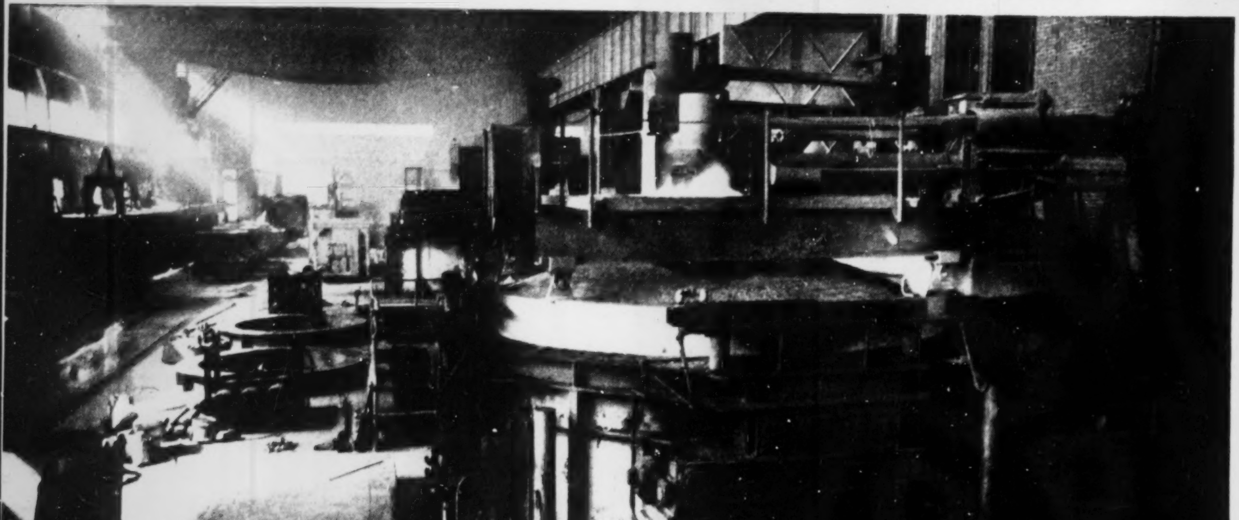
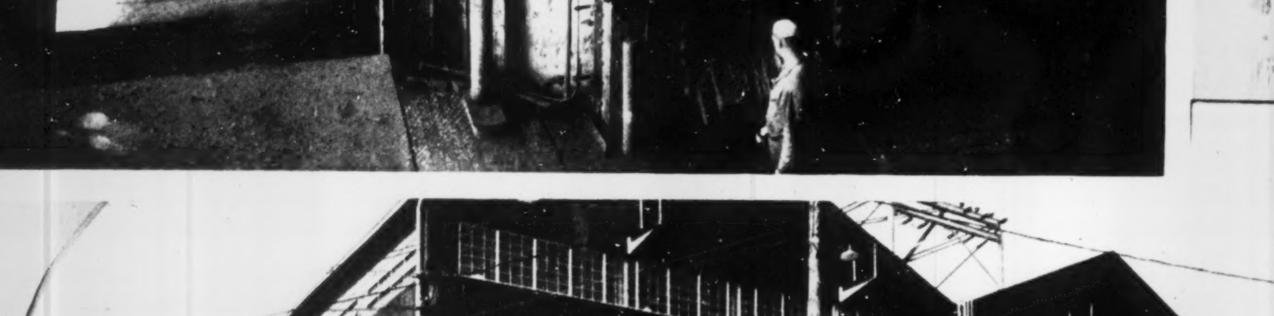
SWINDELL-





-DRESSLER

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The engineering of steel-making facilities "from the ground up" is a major activity of Swindell-Dressler. ● Whether the task is the construction of buildings and furnaces for a new electric melting shop (at left), or the engineering and management supervision of a gigantic open-hearth development in all its ramifications, Swindell-Dressler has the resources, the capacity and the experience for the job. ● Let us discuss your coming requirements.

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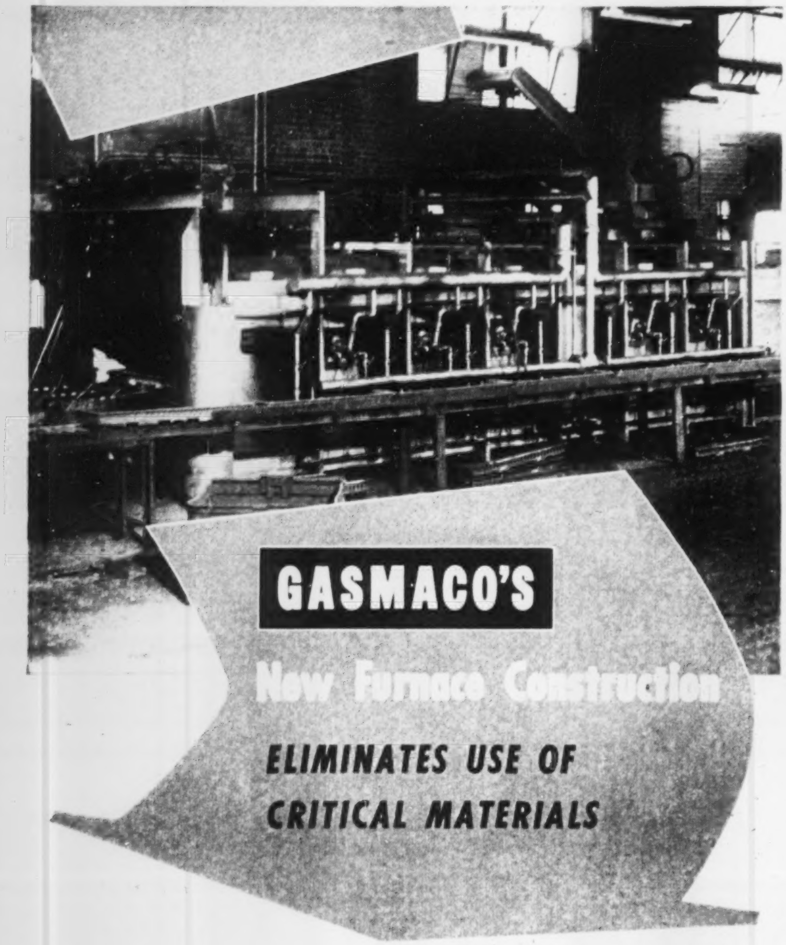

Desirable savings in nickel and other critical materials can be accomplished through new methods in design and construction of industrial furnaces by The Gas Machinery Company.

Specifications for forging and heat treating can be met by employment of a rotary furnace, the construction of which requires only refractory and moderate quantities of carbon steel. Rotary furnaces require less investment for the same duty, and results are superior.

Other Gasmaco accomplishments include the use of silicon carbide in roller hearth furnaces, replacing alloy steel. For practically all applications where alloy steel tubes and rollers were formerly used, silicon carbide can be substituted, with greater benefit.

Our furnace engineers will be glad to point out the many advantages of Gasmaco developments and industrial heat applications which may fit your requirements.

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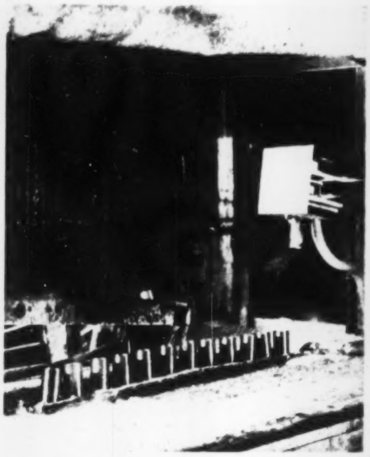
Original purpose of such a gas, now commonly referred to as an RX prepared atmosphere, was to serve as a carrier or diluent for the carbonaceous gases which provide the carbon for the work surface. This RX gas, however, has carburizing potential in its own right. If its dew point is controlled it will carburize to a predetermined carbon concentration.

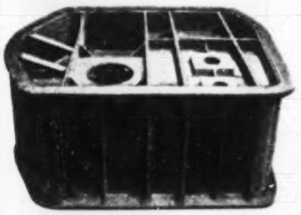


This salt bath set-up is used for heating the ends of alloy tubing to 2200°F for forging and upsetting operations

All the Way Through — This property has been put to practical use in what is now known as homogeneous carburizing. When steel of light gage, say 0.015 to 0.020-inch, is heated in such an atmosphere, carbon will diffuse from the surface inward and throughout the whole cross section of the metal to one definite percentage of carbon, which is in balance with the potential of the surrounding atmosphere.

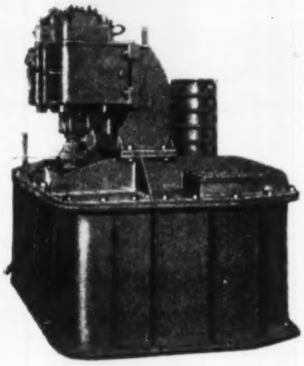
If the original steel is of low carbon content it will naturally carburize. If, on the other hand the carbon content of the steel is higher than that of the surrounding atmosphere, it will decarburize to get into balance with this potential.

Puts Carbon in Springs — One outcome of this development is the production of light gage steel springs which are stamped out of low carbon steel. In the process of heat treatment the stamping is brought up to the desired carbon

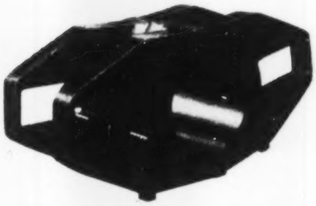


Welded Gear Case

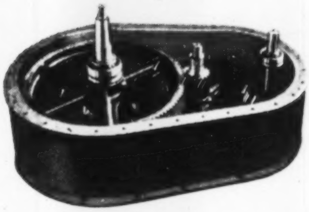
Welded Turbine Housing



Welded Gear Case



Welded Tiller



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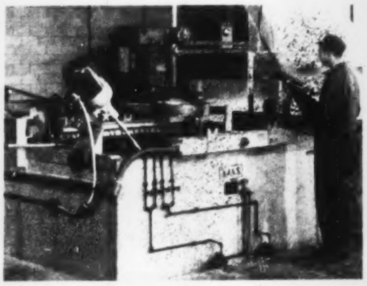
concentration and quenched, combining the carburizing and hardening operation in the same furnace.

Key to Progress—Methods for controlling and recording furnace atmospheres have formed the basis for active investigations.

Problem of furnace atmospheres was first to determine the proper gas; second, to develop equipment to generate it; third, to find a means to measure accurately and automatically the composition of the gas; and fourth, to provide a means of automatically controlling the gas composition.



Martempering these bearing races reduced distortion and eliminated need for a die quenching set-up. 57-61Rc

Experts are pretty well agreed that the best gas is one containing nitrogen, hydrogen, carbon monoxide, plus either small amounts of methane for high carbon steel, or carbon dioxide for low carbon steel. One method of getting such a gas is to crack city or natural gas and air using a catalyst.

Points the Way—Third problem was solved when it became evident that the dew point of endothermic gas was a measure of its carbon potential. This meant that a gas could be evaluated by measuring the dew point, or controlled by regulating the dew point.

A new development, using this principle, is a sensing unit consisting of a chamber in which the gas is ionized by alpha particles. A low voltage is passed through the gas and measured. An increase in water vapor produces a decrease in ion current, which is directly proportional to the increase in water vapor. This sensing element is the basis of the Carbitrol for controlling and recording carbur-

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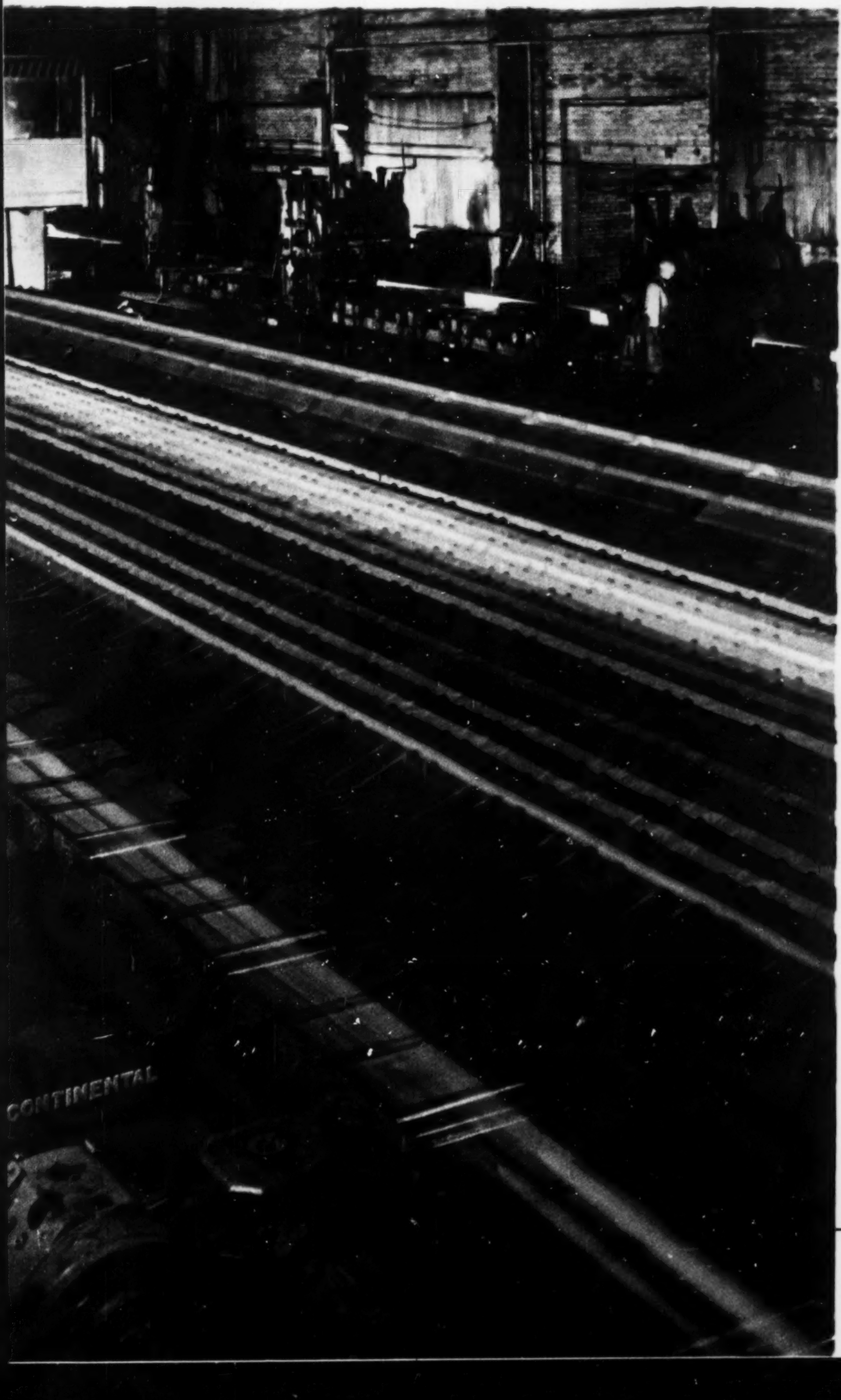
MERCHANT BAR MILL



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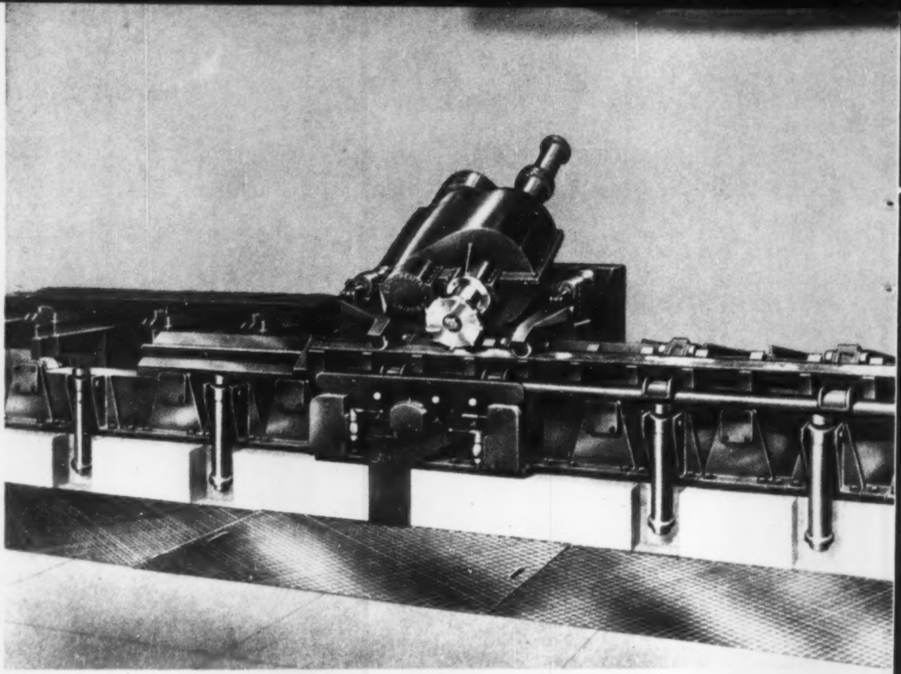

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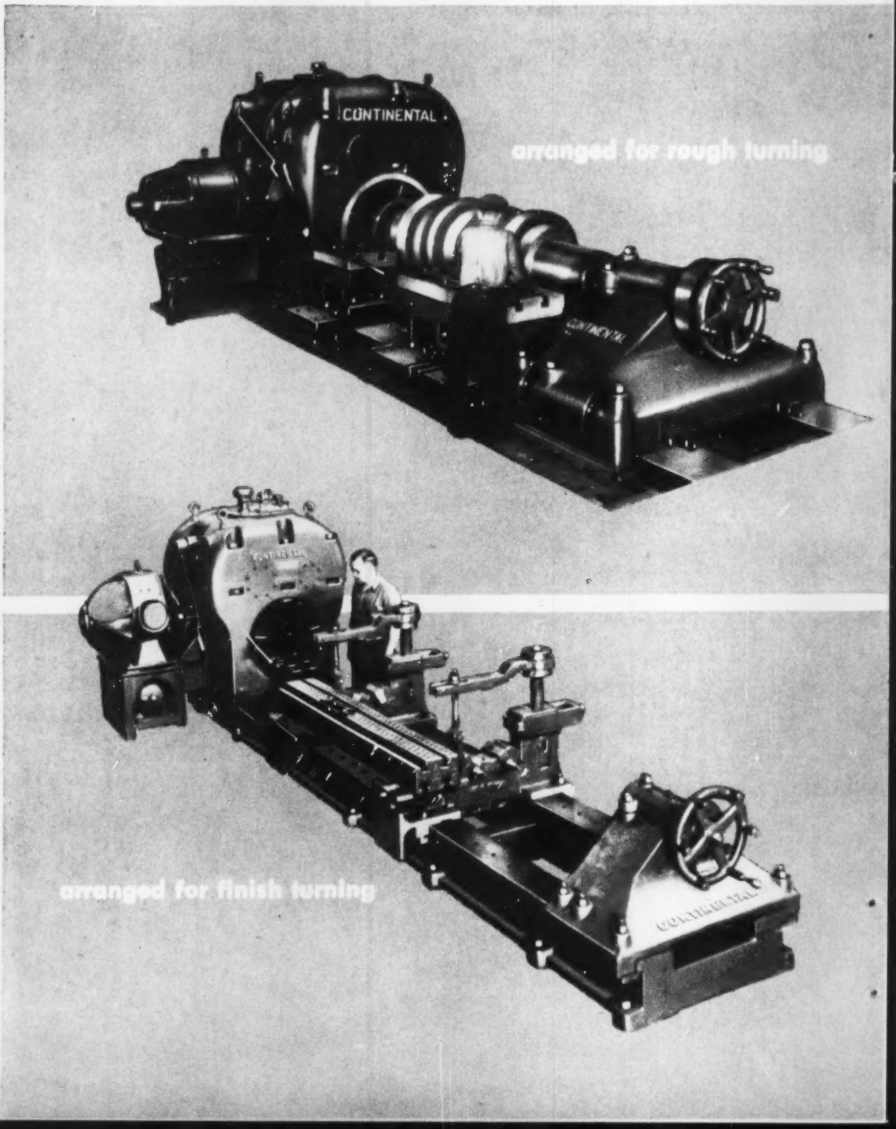
Available in seven standard sizes for body turning, necking and ragging all types of rolls from Rod Mill rolls to largest Plate Mill back-up rolls. Furnished as standard with single headstock and tandem housings for rough turning on centers and finish turning and grooving in housings. All sizes are also available with double headstock, hydraulic tool feed and ragging attachments. D. C. driven headstocks feature two speed ranges by syncromesh gear shift; A. C. operation is provided by a four-speed motor. All headstock gearing is totally enclosed and oil lubricated. Worm and double helical gearing is standard.



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izing atmospheres. Chances are that in the near future such control will be as common on metallurgical furnaces as controlling and recording temperature instruments are today.

Set the Dial—The heat treater sets the pointer on the control instrument for the carbon content of the steel he wishes to treat in the same manner as he sets the pyrometer for the temperature of the steel. The generator will be automatically controlled to produce a protective atmosphere in equilibrium with the steel being treated.

For example, if the heat treater needs to treat a 1.2 per cent carbon steel free from decarburization and scale, he will set the control instrument to a 1.2 per cent carbon potential. The instrument automatically adjusts the air-gas ratio on the generator to produce an atmosphere in equilibrium with the 1.2 carbon steel and continuously records the result.

If the next lot of steel to be heat treated is only 0.30 per cent carbon, he sets the pointer on the instrument to 0.30 carbon potential. The generator is automatically controlled to produce an atmosphere within minutes to be in equilibrium with this steel containing 0.30 per cent carbon.

Trick for Speed-Up—To obtain the maximum rate of carburizing, the generator gas may be enriched with natural gas or propane at the start of the cycle to obtain the necessary "head" or differential required for fast gas carburizing. A timer cuts off the enriching natural gas or propane for the last 25 per cent of the carburizing cycle. The case diffuses inward to the steel and outward to the atmosphere to the exact carbon content set on the control instrument.

Equipment Must Be Right—Proper equipment is a prime requisite to cash-in on gas carburizing. This includes not only the gas generator and controller, but carburizing furnace and quenching facilities as well.

The furnace must be completely sealed from the outside atmosphere so that carburizing gas can be closely controlled. The method

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These parts, representing BIG Production and small batches are Case Hardened by Dry (gas) CYANIDING in SURFACE CONTINUOUS and BATCH TYPE CONTROLLED ATMOSPHERE FURNACES

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① Low Cost Operation
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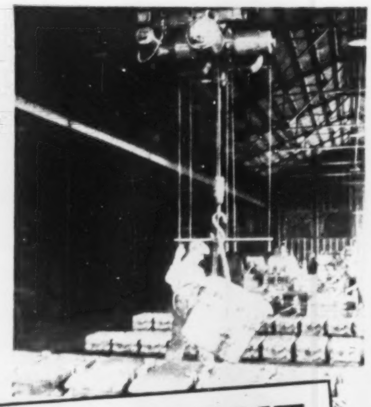
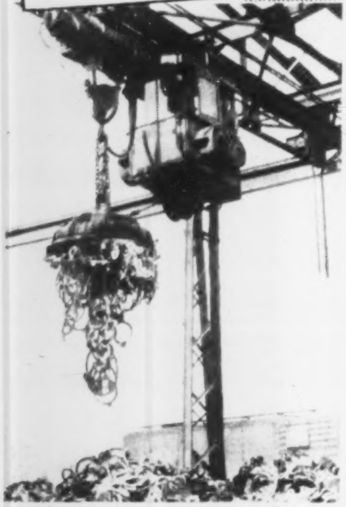
Operator mainly occupied with other duties. Hoist used for fast, efficient handling of relatively short hauls.



WHICH HOIST is RIGHT FOR YOUR JOB?



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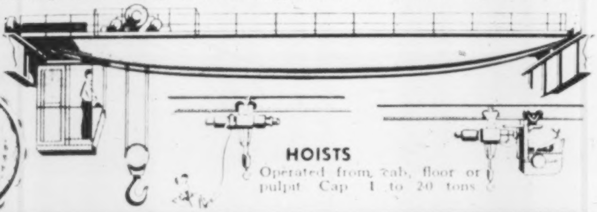
Cab-Operated Hoist

Operator in cab moves loads along at high speeds—occupies best vantage point for spotting or stacking materials.

Choosing the hoist that's right for your job calls for expert advice.

Let the Shepard Niles representative in your area guide you in your choice. He specializes in through-the-air handling—can help you select the hoist that best fits your job. Write Shepard Niles today for latest bulletins describing both types of hoists—and ask to have a representative stop by your office.

CRANES
Overhead: Top running, inner running, under running, floor or cab operated. Cap: 1 to 450 tons



HOISTS
Operated from cab, floor or pulpit. Cap 1 to 20 tons

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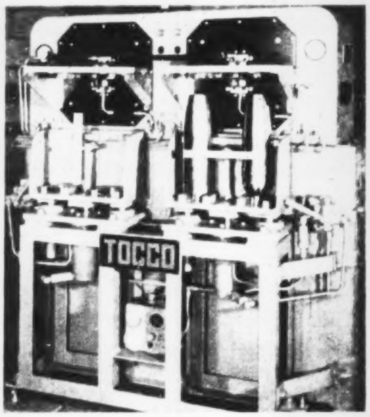
of admitting and circulating the carburizing atmosphere must be engineered so that there is uniformity of carburizing throughout the furnace load. Also, the temperature must be uniform throughout the load.

Quenching facilities must be such that the carburized parts are quenched under atmosphere so that it is impossible to scale the work. Parts should come out of the quench bright and ready for use with the least amount of further processing. Another important point — the quench should be automatically variable in severity to obtain least distortion, proper strength and residual stress conditions.



Nose adapters on these heat treated ordnance shells are silver brazed by induction. Physical strength of the shell including fragmentary requirements are not disturbed by operation

Hot Oil Helps—Advantages of interrupted quenching are in eliminating possibility of cracking or in reducing dimensional changes and warpage in the hardening process. Many variables such as steel composition, section of the piece, temperature of equalizing bath, and cooling rate must be correlated to obtain full martempering.

Shop experience has been that hot oil quenching assists in getting required hardness while holding dimensions within the permissible limits in cases where the customary quench caused excessive distortion.

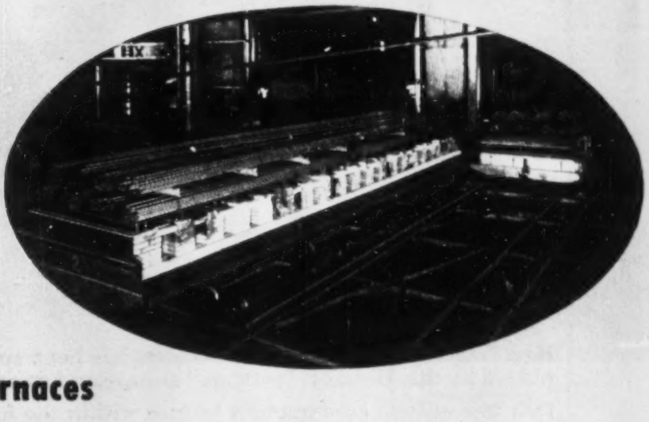
Watch These—Two operational features are especially significant:

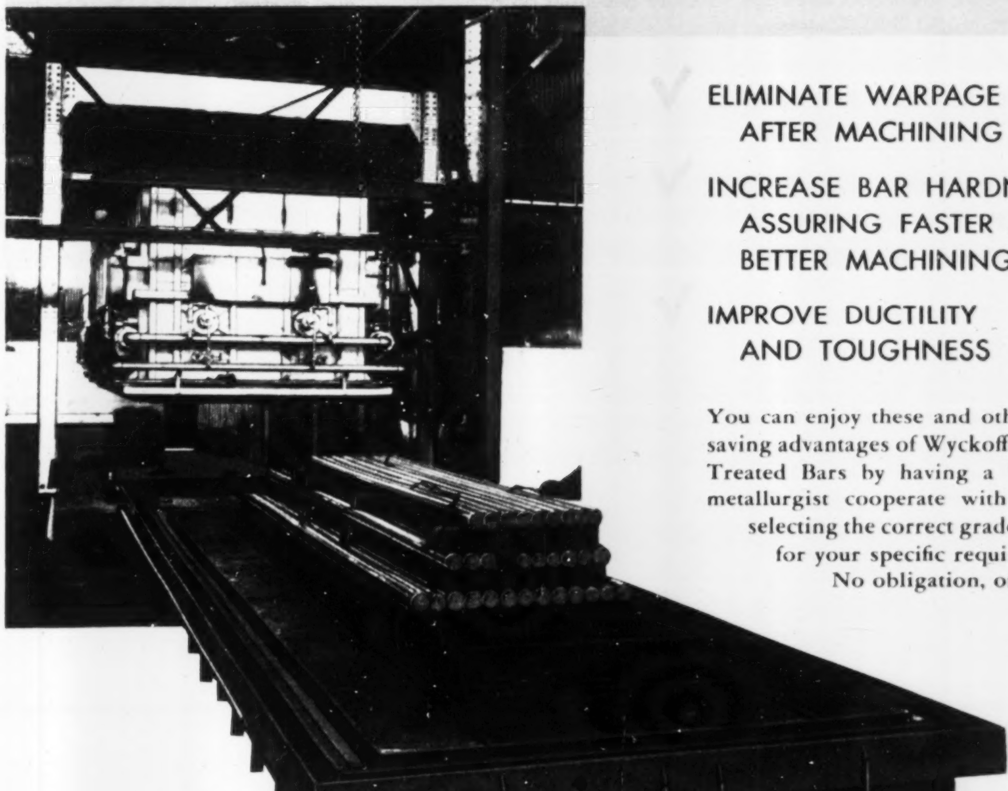
WYCKOFF

Cold Finished
STEEL BARS

STRESS RELIEVED

in these Heat Treating Furnaces





ELIMINATE WARPAGE AFTER MACHINING

INCREASE BAR HARDNESS, ASSURING FASTER AND BETTER MACHINING

IMPROVE DUCTILITY AND TOUGHNESS

You can enjoy these and other cost-saving advantages of Wyckoff Furnace Treated Bars by having a Wyckoff metallurgist cooperate with you in selecting the correct grade of steel for your specific requirements. No obligation, of course.

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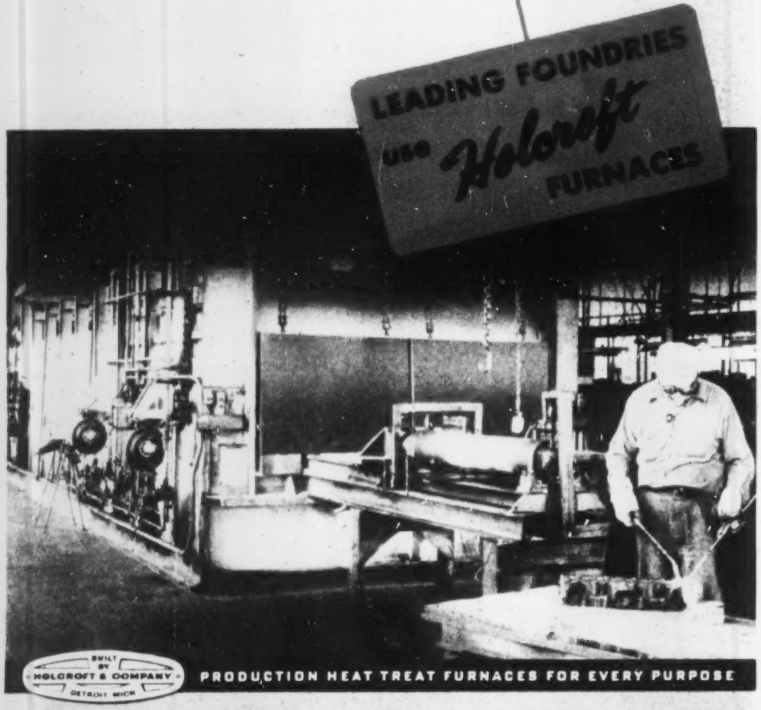
Heat treating welded cracked castings has been simplified by this Holcroft "salvage" annealing furnace.

Due to a unique construction feature within the furnace—hot, annealed castings actually pre-heat cold ones entering the furnace.

It is due to such advancements in efficient furnace operation that substantial savings in fuel are realized by owners of Holcroft furnaces. If Holcroft furnaces *do* cost a little more—savings in fuel and extra efficiency soon start paying dividends to the user.

Leading industries throughout the country today look to Holcroft for such modern techniques in their foundry procedures. They know that Holcroft since 1916 has been the heat treat leader.

You, too, can take advantage of this furnace and heat treat experience. We appreciate your inquiries. **Holcroft and Company, 6545 Epworth Blvd., Detroit 10, Michigan.**



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HEAT TREATING

First, heating or temperature control, and second, recirculation of oil past charge as it is quenched.

For heating, an adequate surface area for heat transfer to the oil allows a minimum temperature differential, when heat application is uniform. Radiant tube heating with fins leading from the duct work permits rapid transfer without excessive coking or decomposition of the oil. While recirculation is important in improving the transfer from the heating surface, control of the flow rate during the quenching operation dictates design features of the oil flow system.

Here's How—The charge uniformly loaded on a grid tray and shrouded with an open container, is lowered in the bath such that in the down position a seal is effected in the suction portion, and a low head—high flow propeller pulls the oil vertically through the charge. A variable speed drive allows a choice of the maximum flow rate, while a variable orifice device determines the set low flow rate during some period of the quenching or during the idle time.

If proper consideration is given to other design features, such as bath volume with reference to weight of charge and suitable oil composition, temperatures from 350 to 400° F, may be used for extended periods without undue deterioration of the quenching medium.

Quenching from a vestibule sealed to the bath allows more complete control of surface chemistry as well as cleanliness. There the vestibule provides the complete seal to work chamber as well as to the bath, atmosphere control and safety benefit.

Hot oil quenching is readily adapted to a variety of treatments, including low case carbonitriding with ammonia and hydrocarbon additions, deep case carburizing with surface concentrations held close to the eutectoid composition and clean hardening of high carbon steels. One point, particularly, should be kept in mind—for interrupted quenching, surface conditions as they influence heat transfer and transformation phenomena are of special importance.

The rubber ball that **wouldn't** bounce . . .

There's more to rubber than bounce! Rubber parts, therefore, must be specifically engineered to meet the requirements of their intended applications. In addition to elasticity, many special properties are essential for dependable performance. These include resistance to extreme temperatures or weather conditions, the ability to withstand oils and other petroleum derivatives, resistance to various chemicals, and long life despite abrasive actions encountered in many applications.

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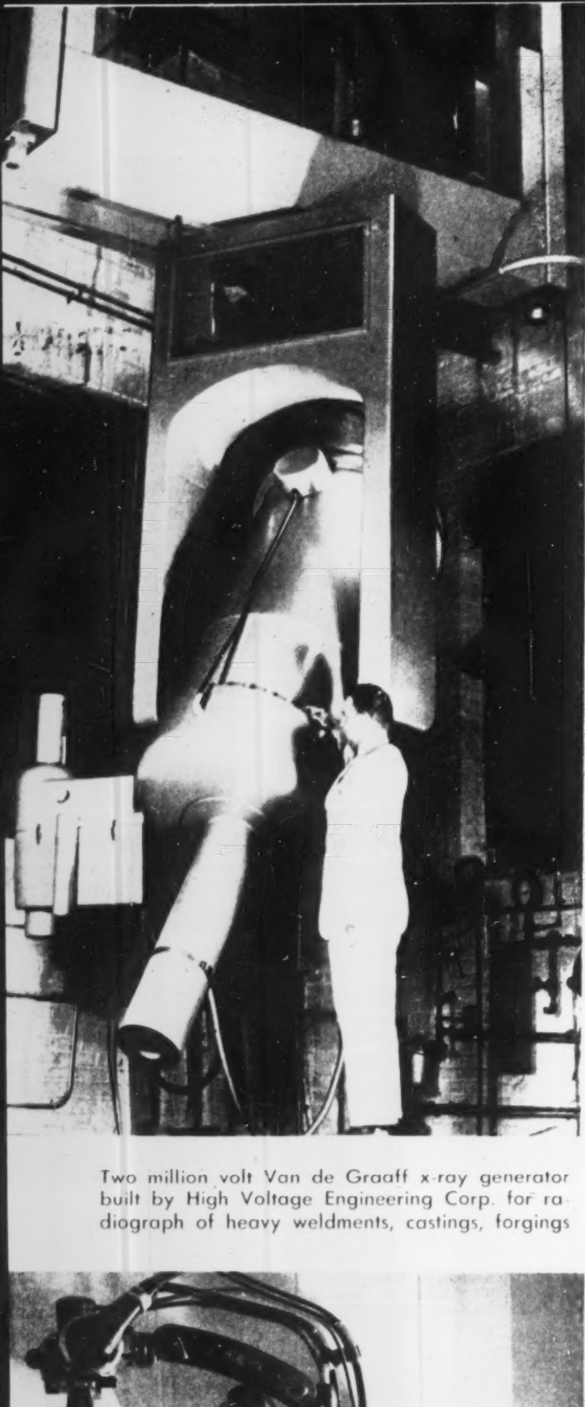


Two million volt Van de Graaff x-ray generator built by High Voltage Engineering Corp. for radiograph of heavy weldments, castings, forgings

Radiography is used more and more frequently to test internal soundness of materials and components. This portable Picker x-ray unit is being set-up to inspect aircraft parts

FORUM ON TECHNICAL PROGRESS

Scientific inspection in early stages of manufacture not only finds flaws but helps prevent them. Progress in equipment adds to efficiency and accuracy in production line applications

WHY did the part fail? If it passed your inspector, chances are you were sabotaged by hidden defects.

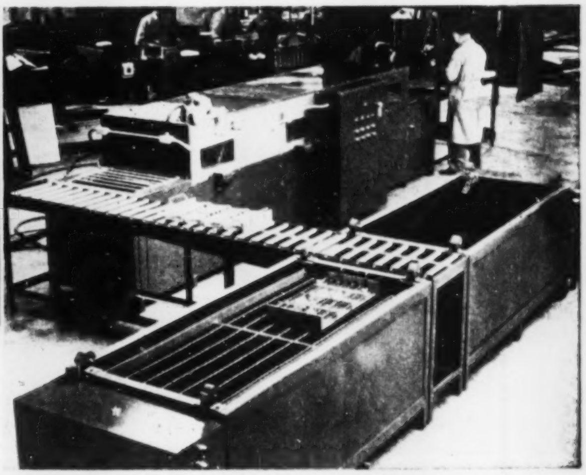
Testing and inspecting—the scientific kind—is being used by more and more plants at the earliest possible stage of manufacture to locate defects which otherwise would not appear until after final operations. Among other things, valuable machine and man-hours are saved.

Figures released by two manufacturers, one in the heavy metal industry and the other in the airframe industry, show that in both cases 13 per cent of total production costs are spent on nondestructive testing.

This becomes a significant figure in terms of the total cost of a military airplane. However, greater significance must be given to the industrial adoption of a 13 per cent premium insurance policy to safeguard against a 100 per cent loss.

Since, in many operations, la-

Sheets of stainless steel and other materials formerly too thin for ultrasonic testing are now inspected by surface wave techniques with this Sperry instrument



Semi-automatic conveyorized Zyglo unit for high speed inspection of jet engine turbine rotor buckets. Crack-like defects are picked out under black lights in hood

bor and material costs are fixed, nondestructive testing is becoming an increasingly potent economic weapon.

New equipment brought out during the past year will add greatly to the accuracy and efficiency of testing and inspecting.

In the field of radiography, new x-ray equipment reflects the trend for increased portability for field applications. One new x-ray unit has a tube weighing less than 150 pounds, and is capable of being operated 200 feet away from the power source.

Fluoroscopic images are now five times brighter than was formerly possible due to a new intensifying tube. The polaroid photographic technique is being used to obtain x-ray images in 1 to 2 minutes. Further study of this process has provided improved mechanism. Equipment will become available for industrial radiographic use during 1953.

Particle accelerator x-ray generators are now available with energy outputs up to 30 million volts. A better understanding of optimum voltages required for x-ray inspection developed from increased experience.

Increased availability of pile produced isotopes in a wider energy range opened up new fields of gamma radiography.

There is increased use of the liquid bath in ultrasonic testing. New inspection techniques whereby ultrasonic waves travel near the surface of materials were field evaluated last year for the first time.

With conventional test methods, the past year saw the development of special semiautomatic or automatic machines for rapid and economical inspection of parts on production line basis. Automatic machines were built for volume inspection of jet engine compressor blades and turbine buckets.

One significant development in the quality control of tool steels was the first successful application of a direct reading spectrometer for the determination of their chemical analysis. All high alloy steels produced by one manufacturer are now analyzed on a direct reading spectrometer with a significant savings in time and a resultant increase in plant flexibility and capacity.

There has been a renewed effort on the part of quality control departments in many plants to standardize surface finish terminology for grinding and maching operations.

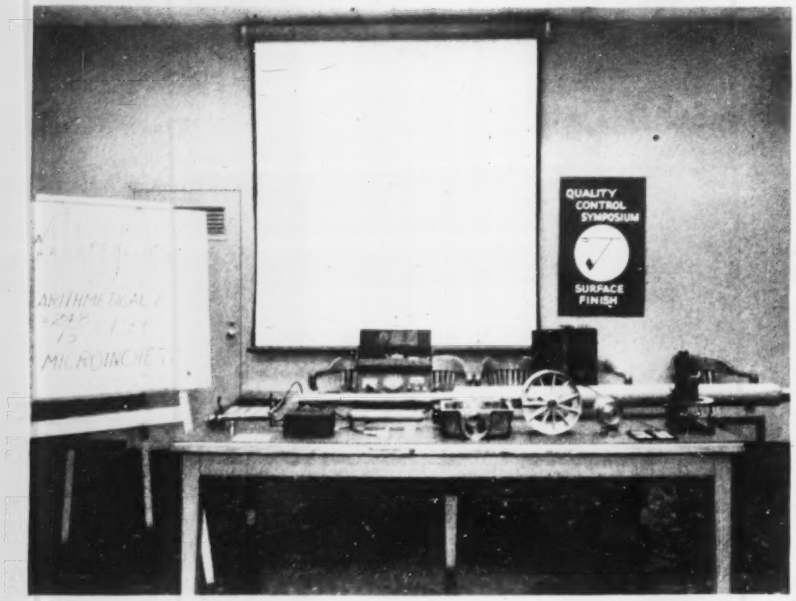
Internal Soundness—Use of x-ray equipment for testing and inspection reached unprecedented levels during 1952. Radiography was called on more and more frequently to answer questions about the internal soundness of materials and component parts.

This reflects not merely the pressure of high-military standards in defense production, but more significantly the growing awareness among quality control experts that nondestructive testing provides not only a means of *finding* flaws but also a means of preventing them in production applications.

Portable X-Ray—New equipment was introduced which greatly simplifies production radiography in small or congested areas. Several x-ray machines became available for the first time during the year which are small in size, light in weight, and yet have the capacity of similar units of conventional design. Operating at the ends of long, low voltage cables, the transformer and end grounded tubes can easily be moved and located by two men.

Take Tester to Product—Resotron 250 is a midget-type x-ray inspection unit of the portable type which was announced by General Electric in October, 1952. It looks something like this: 15 inches in diameter, and 44 inches long; weight is only 150 pounds. The unit can be carried around a welding shop, foundry, construction job or pipeline project hundreds of feet from its source of power. It can be manipulated into all sorts of positions for inspection. When used in remote areas power is supplied by a motor generator set.

Despite its small size, the unit



A surface finish quality control program was introduced at Yale & Towne Mfg. Co. with a symposium which included all the engineering personnel, all the supervisory employees together with the entire quality control department

will operate anywhere from 75,000 to 250,000 volts and will inspect 3½-inches of steel in an economical time. Several of the midget units are being used by the Navy for inspection involved in fabrication of ship parts and in refitting.

Voltages Go Higher—Problem of inspecting greater and greater thicknesses of metals being used in modern armament and civilian apparatus is being solved with supervoltage x-ray.

As the fanfare, which usually accompanies anything in the "super" class, gradually died down, it became evident that extreme voltages were not really necessary. In fact, it now appears that there is little to be gained in going above 15 million volts, since the percentage of radiation transmitted through the metal at higher voltages falls off progressively.

For instance, with exposure of 0.1 minute, the 50 million volt Betatron will handle steel 3.7-inches thick, whereas a 15 million volt machine will provide the same exposure for 3.9-inch thick material in the same time period. This relationship exists throughout the range up to 12-inches or more.

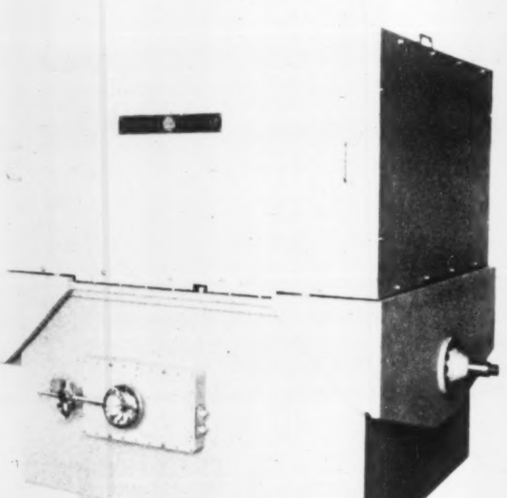
With the principle, optimum voltage instead of abnormally high voltage, in mind, the new 15 million volt Betatron was introduced early in 1952 with a considerable reduction in size over previous supervoltage machines.

This machine will produce the extreme sensitivity of 0.125 per cent in steel at 8 inches, using lead screen and type A film. Sensitivity of the 15 million volt Betatron increases as the thickness of the steel increases, so that on a 14-inch thickness, users can detect a void only 0.042-inch in cross section. This unit also provides an extremely fine focal point, which results in maximum detail in radiographs. Larger field sizes of the unit provide broad coverage of product area.

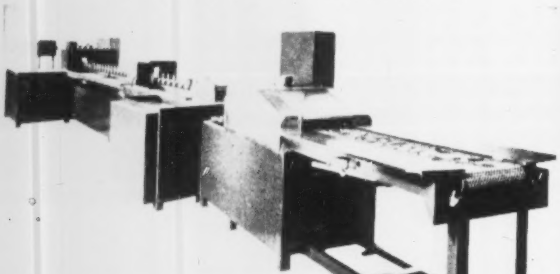
Minute Details—An x-ray source for the radiographic examination of heavy weldments, castings, and forgings 2 to 12-inches thick has been developed by High Voltage Engineering Corp. The first of this new series of compact two-million volt Van de Graaff x-ray generators was recently completed for use by "Foster Wheeler Corp.

The generator is contained in

At right is shown magnet assembly for industrial Betatron. For inspection work, with a film target distance of 4 feet it is capable of taking a radiograph through 10 inches of steel in 4 minutes



Semi-automatic Magnaflux unit for conveyorized high speed inspection of jet engine compressor blading at repeated steps during manufacture



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Riehle Universal Testing Machines are built with hydraulic loading unit or screw power loading unit. Each type is available in a variety of sizes, with capacities up through 400,000 lbs. Ask your Riehle representative or write our factory for illustrated catalogs.

60,000 lbs. capacity Riehle Screw Power Universal Testing Machine illustrated. Photo courtesy of USAF Institute of Technology, Wright-Patterson Air Force Base.

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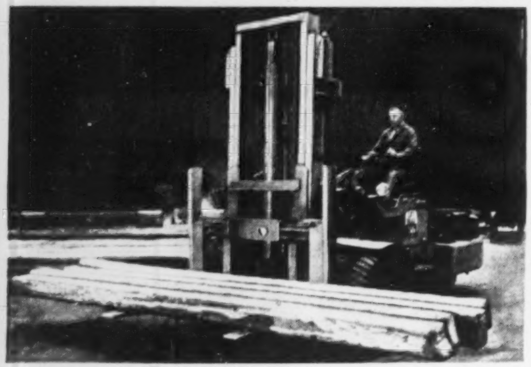

Here you see a LIFTRUK in the *Timken Roller Bearing Company* plant, Canton, Ohio, carrying a load of 10 tons of alloy steel forgings. This is but one of hundreds of important movements required of a LIFTRUK in the metal-production fields.

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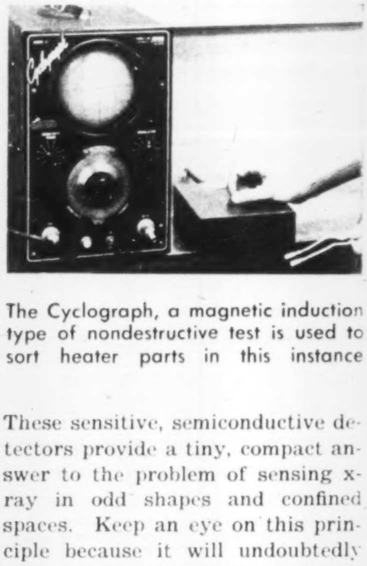
a pressure vessel 3 feet in diameter and 6 feet long and can be flexibly mounted for maneuvering about bulky objects. Actual x-ray source can be inserted through a manhole in a pressure vessel for the radiography of girth beams with one exposure. Because these penetrating x-rays generate from a source less than 0.5 mm in diameter, the shadows cast by the object and its discontinuities are exceptionally sharp. This permits observation and recording of minute details such as cracks, microshrinkage and porosity.

X-Ray Gages—X-ray know-how has been applied in the development of gages to check thickness of sheet steel in finished products, such as hollow-steel propellers.

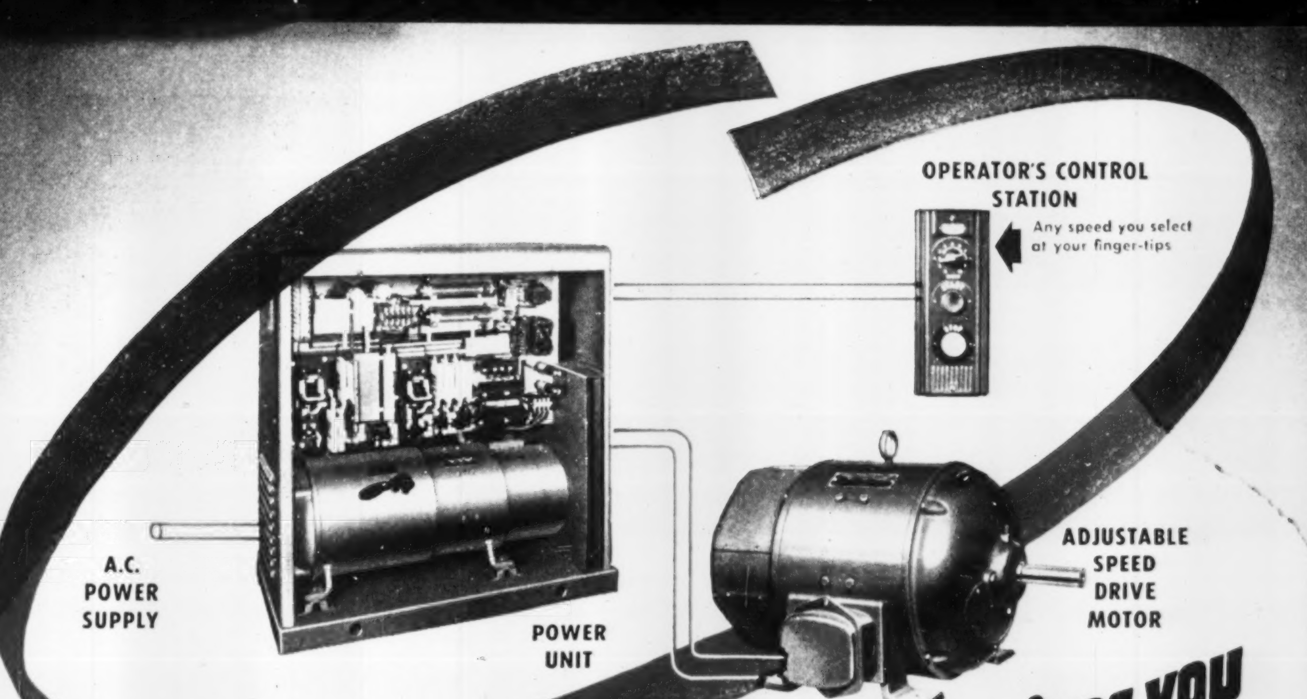
Principle behind the new devices is the cadmium sulphide crystal. These sensitive, semiconductive detectors provide a tiny, compact answer to the problem of sensing x-ray in odd shapes and confined spaces. Keep an eye on this principle because it will undoubtedly find increased application in the future.



The Cyclograph, a magnetic induction type of nondestructive test is used to sort heater parts in this instance

No Need to Buy — Equipment producers have service plans whereby x-ray testers can be leased. This makes initial capital investment unnecessary. It relieves the lessee from burdens of property taxes, insurance, obsolescence, maintenance, replacement parts, repair, depreciation, and distress sale.

Atomic Radiation—Recent developments in the field of nuclear energy have made available new sources of radiation for radio-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The real answer to many of your operating and production problems is right here — with the Louis Allis Select-A-Spede Drive, featuring the new Magnetic Amplifier Control. This drive provides unusual flexibility and positive control — flexibility and control you never thought possible from an A.C. line. You get increased production from your machines, fewer operating headaches, with the exact speed you need for your job — when you want it, where you want it.

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There are probably many operations in your own plant right now where a Select-A-Spede can save you time and trouble — boost production and efficiency.

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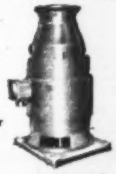
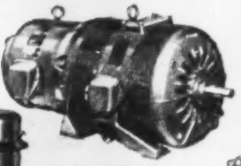

Extractor Motor with Integral Blower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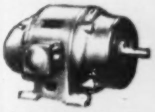
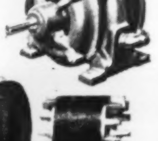

Splash-Proof Motor with Flange


Self-Cleaning Textile Motor

Gearmotor

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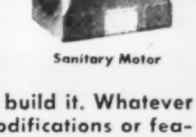
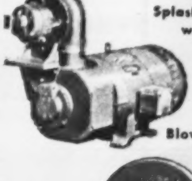
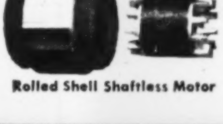
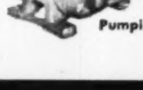

Sanitary Motor


Blower Ventilated Frequency Converter


Rolled Shell Shaftless Motor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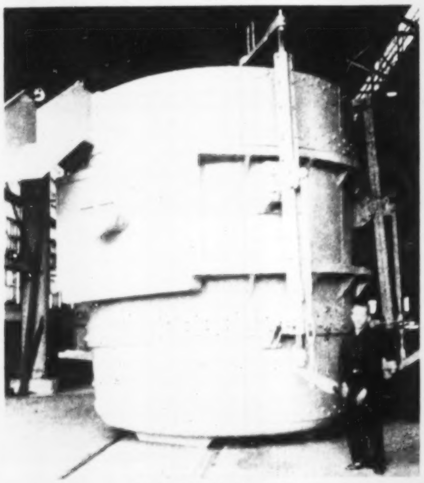

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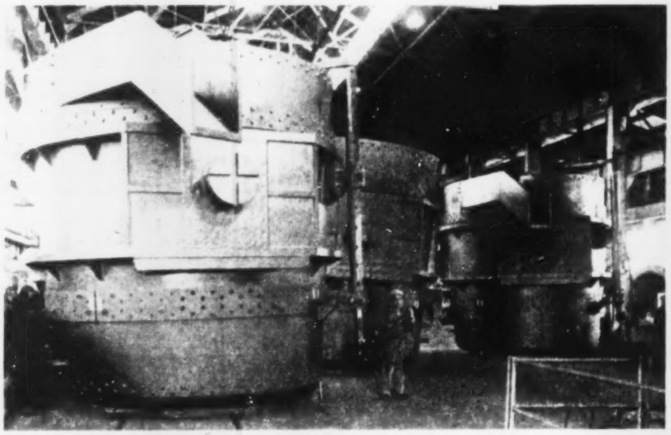
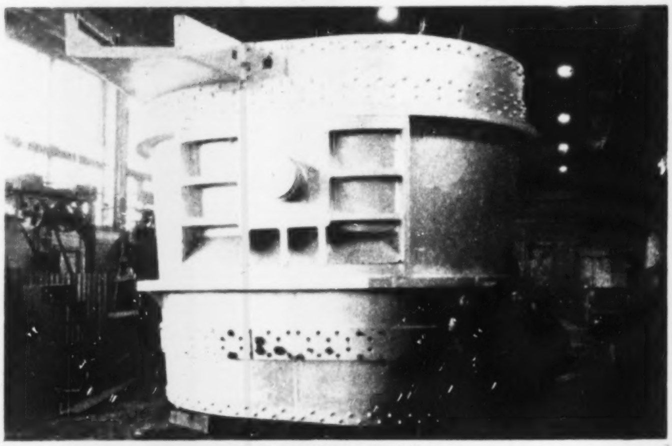


250 TON LADLE



300 TON LADLE

[redacted]

graphic testing. Radium has long been a source of penetrating radiation for testing. Low initial cost of radioactive Cobalt 60, an intense gamma radiation source, has encouraged its use for industrial radiography.

Availability of this new material makes gamma radiography practical in small foundries and other shops where sometimes it is felt that the purchase of an x-ray machine is not justified.

Artificially radioactive gamma sources are being used successfully and new equipment associated with high intensity source radiography is available. With high intensity gamma ray sources, considerable reduction in exposure time can be effected by using calcium tungstate screens.

Rough aluminum aircraft casting inspected with Zyglo. Fluorescent lines show up the cracks before parts are machined, correct casting process

Penetrating-radiation test methods as used industrially have a number of proven applications. They are an excellent means of recording irregular voids located at random within the test piece. Such methods also show-up hidden or interior surfaces or contours, so that casting misruns and possible misfits in assembly can be detected. Film radiography provides a good way of testing fusion welds for porosity, insufficient penetration, internal cracks and other similar defects.

Shortcomings — Since radiation used in such tests is basically-sensitive to the mass quantity of matter it encounters, it is by nature a poor

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A. BEATTY Guillotine Bar Shear for "short order" shearing of bars, angles, rounds and squares.

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E. BEATTY CoPunShear, one unit that does coping, punching and shearing without changing tools.

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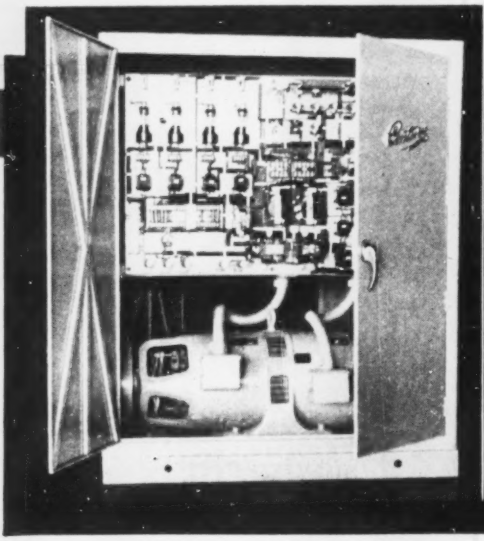
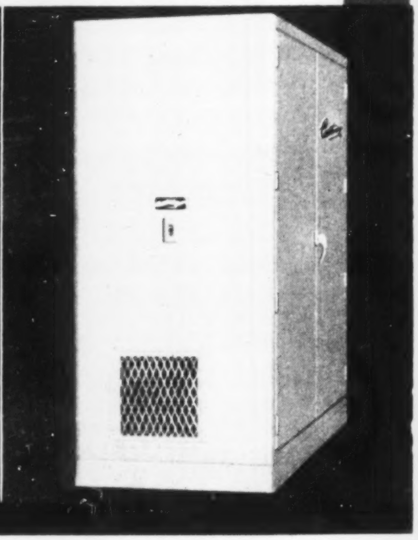
POWER UNIT — Inside front view showing control and motor generator set.



Side view of power unit showing air cleaner for forced air ventilation.



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- You can instantly dial the OPTIMUM carbide tool cutting speed for any diameter of work or class of material.

- For repetitive production, you can automatically control the correct OPTIMUM pre-set cutting speeds for two or more diameters.

- Also for repetitive production you can automatically control the OPTIMUM carbide tool cutting speeds for all the varying diameters of a facing operation.

- You can perform a continuous, closely controlled process on flat or round material:

1. With a wide range of speed adjustments to suit various material sizes and processes.
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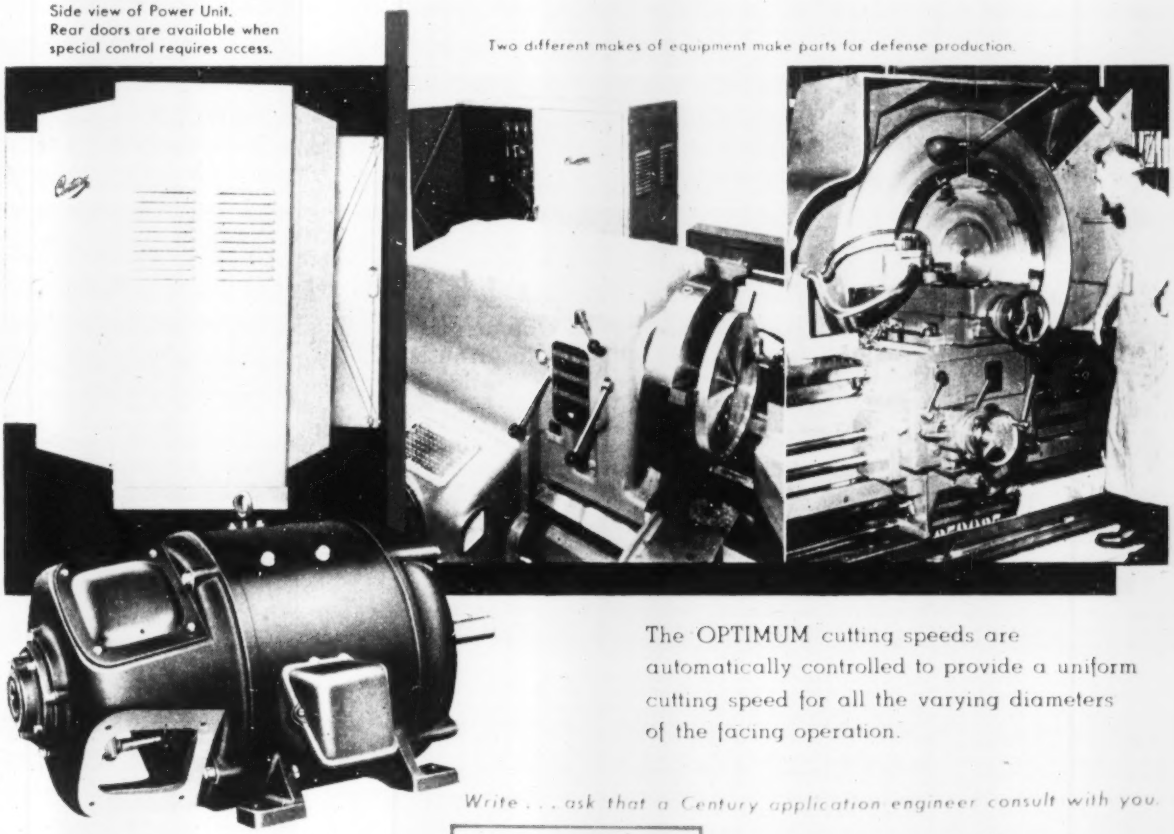
- You can accurately control assembly line conveyors over a wide range of speeds, and precisely coordinate the speed and timing of feed conveyors.

- You can: (1) inch the load . . . (2) accelerate the load fast or slow . . . (3) stop the load quick or slow . . . (4) stop and start at a controlled pre-set speed . . . (5) reverse the load under specific conditions . . . and (7) you can use a multiple of co-ordinated drives for related functions.

- Because of the minute amount of control current required for handling large horsepower, many forms and shapes of control devices are available with this most versatile Century Selective Speed Drive. These pilot controls can often be mechanically interlocked in the driven machine to direct specific functions.

A Century motor specialist will be glad to discuss with you the specific benefits you can get from Century Selective Speed Drives. They may be adapted to your present — or new — production equipment.



Side view of Power Unit.
Rear doors are available when special control requires access.

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The OPTIMUM cutting speeds are automatically controlled to provide a uniform cutting speed for all the varying diameters of the facing operation.

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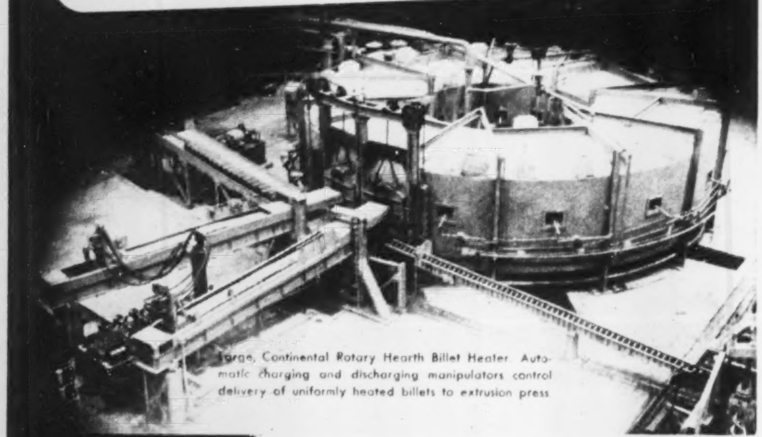

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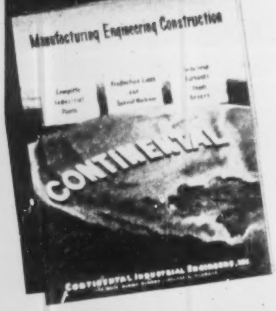

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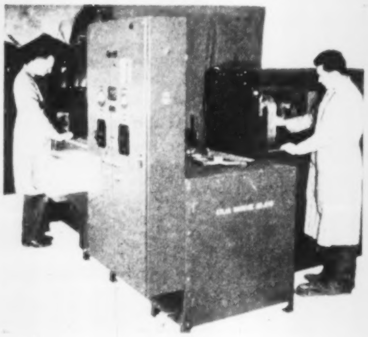
means of revealing thin cracks and laminations not lined up with the beam. Radiography is not a satisfactory test method for finding flat spots or penetration defects in flash or pressure welds. These are thin, discontinuous films which are seldom oriented in the plane of the radiation beam.



This Magnaflux-Magnaglo test unit automatically processes a wide range of rough forged automotive parts

Having highlighted some of the developments of the past year in x-ray inspection methods, it is appropriate to take a look at advances made in test methods based on other principles. Some are ideally suited to fill the gap left by radiation methods. Others have the advantage of lower cost and simplicity.

Management is coming more and more to believe that the cost of testing is determined by the proper selection of methods and schedules above anything else. If several tests are needed a good policy is to use the simplest, lowest cost test first, and the more elaborate tests later, if required.

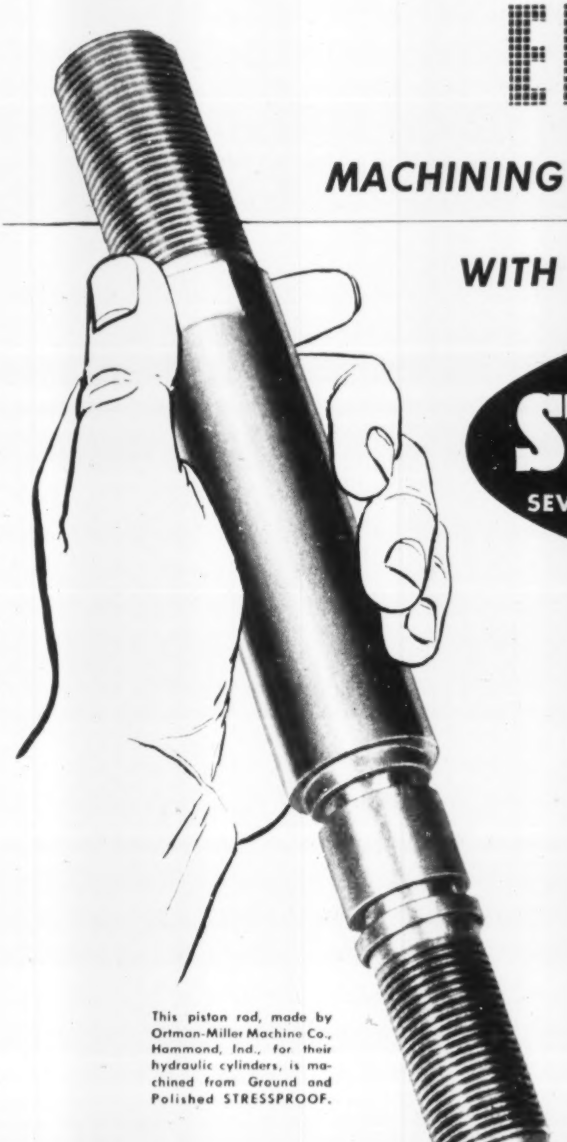
Help Each Other—As the experience gained each year is catalogued, it becomes more and more evident that the various test methods supplement each other. Frequently it is advantageous to use radiography in combination with other methods such as ultrasonics and Magnaflux.

Magnetic particle inspection (Magnaflux) responds best to fine cracks, laminations and other flaws which approach the surface of the part. On the other hand, radiographic methods are best for deep

ORTMAN-MILLER SAYS . . .

WARPAGE AND BENDING ELIMINATED

MACHINING SPEED INCREASED 20%



This piston rod, made by Ortman-Miller Machine Co., Hammond, Ind., for their hydraulic cylinders, is machined from Ground and Polished STRESSPROOF.

WITH GROUND AND POLISHED

STRESSPROOF®

SEVERELY COLD-WORKED, FURNACE-TREATED STEEL BARS

When this piston rod was made from C1018, Ortman-Miller had trouble with warpage after machining, and with bending and wear in operation. By switching to Ground and Polished STRESSPROOF, warpage was eliminated and machining speed increased 20%. In addition, STRESSPROOF had the strength to prevent bending, and wear became no problem.

STRESSPROOF has improved quality and lowered costs in hundreds of similar applications because of its unique combination of four qualities in-the-bar: (1) *High Strength*, double that of ordinary cold-finished shafting; (2) *Machinability*, fully 50% better than heat-treated alloys of the same strength; (3) *Wearability*, without case hardening; and (4) *Minimum Warpage*. STRESSPROOF is available in cold-drawn or ground and polished finish.

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In designing machine tools, as in planning countless other products, OSTUCO Steel Tubing provides an endless pool of practical ideas because of its *unlimited adaptability.* Collets, chucks, spacers, spindles, bearings, shafts, ferrules, and handles are but a few of the applications.

By varying the radius of a bend, the length of a taper, the dimension of an upset, etc., an old design can be improved or a new one created. By combining such operations, a part can be made to serve several functions, thus simplifying design. Parts may even be fabricated or forged beyond recognition as a tube section.

Whether you design machine tools or products of a distinctly different nature, you will want to investigate the many quality-improving, cost-reducing features of OSTUCO Tubing.

Write Dept. S-1 for "OSTUCO TUBING"—a new, informative catalog on seamless and welded tubing and its fabricating.

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OSTUCO TUBING
Tapering • Swaging • Flanging • Bending
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Manufacturers and Fabricators of Seamless and Electric Welded Steel Tubing

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lying cavities which are not handled too well by Magnaflux.

Radiography may fail to reveal laminations transverse to the direction of the beam. Ultrasonic reflections from such laminations make it possible to locate them effectively.

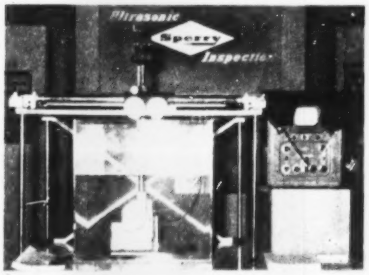
Sound Waves Basis for Test — High frequency, short length sound waves have properties which make them useful for materials inspection. Since they are short waves, they are reflected from flaws. Such ultrasonic waves also penetrate thick sections of steel and aluminum.

Three ultrasonic methods are used for inspection: reflection; through-transmission and resonant-frequency.

Ultrasonic reflectoscope is used for testing defects in metals and other materials. Here, the ultrasonic beam finds discontinuities up to 30 feet in aluminum and more in steels. It is used to inspect sheet and plate for laminations, rolled-in inclusion and other defects.

Where Used—Other applications of the ultrasonic reflectoscope are: (1) inspection of gun barrels during machining; (2) quality control of ingots, billets, bars; (3) inspection of incoming machining stock—bars, castings, forgings, plate and laminated stock; (4) testing of machine parts, such as axles, crankshafts, gear blanks, rolls, bearings, shafts, rotors, studs, and thrust collars; (5) inspection of tool steels and die blocks; (6) periodic examination of metalworking equipment—power shafts, axles, hydraulic press cylinders, studs, etc.

One manufacturer tests aluminum bars for inclusions with the reflectoscope before they are forged



Ultrasonic immersion testing is used for complicated shapes with irregular surface such as this aircraft forging

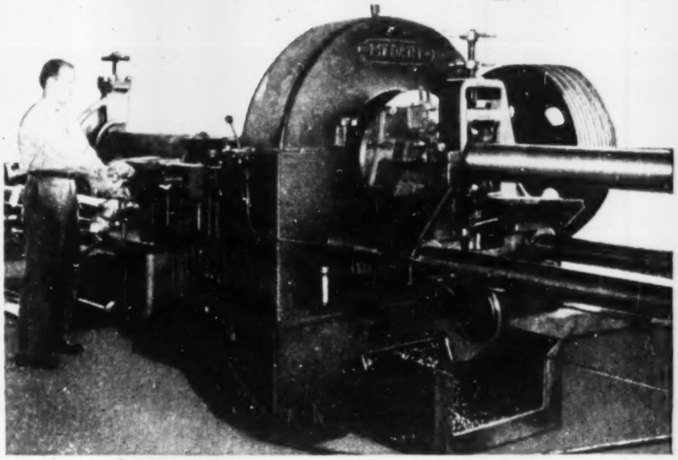
Fully Automatic Centerless Turning & Peeling!

. . . for bars and tubes from 1" to 9" diameter, and larger

MEDART

MODEL RFRG

CENTERLESS TURNER



- For high production superior finish, close-tolerance turning or rough peeling. Workpiece size and throughput speeds are limited only by capacity of cutting tools.
- New direct-drive roll-feed with patented Universal Centering Device insures continuous, positive feed and automatic centering of workpiece in cutterhead.
- Separate variable drives for feed and cutterhead give exact ratios between cutter speeds and bar feeds.
- Either 1 or 2 removable cutterheads may be used, with from 1 to 10 cutters for maximum cutting flexibility. Either carbide or high-speed tools are used.
- Eliminates time lost in loading and unloading. Automatic input and output grip carriages permit constant end-to-end feed and delivery.
- Fully automatic push button control from central operating station.

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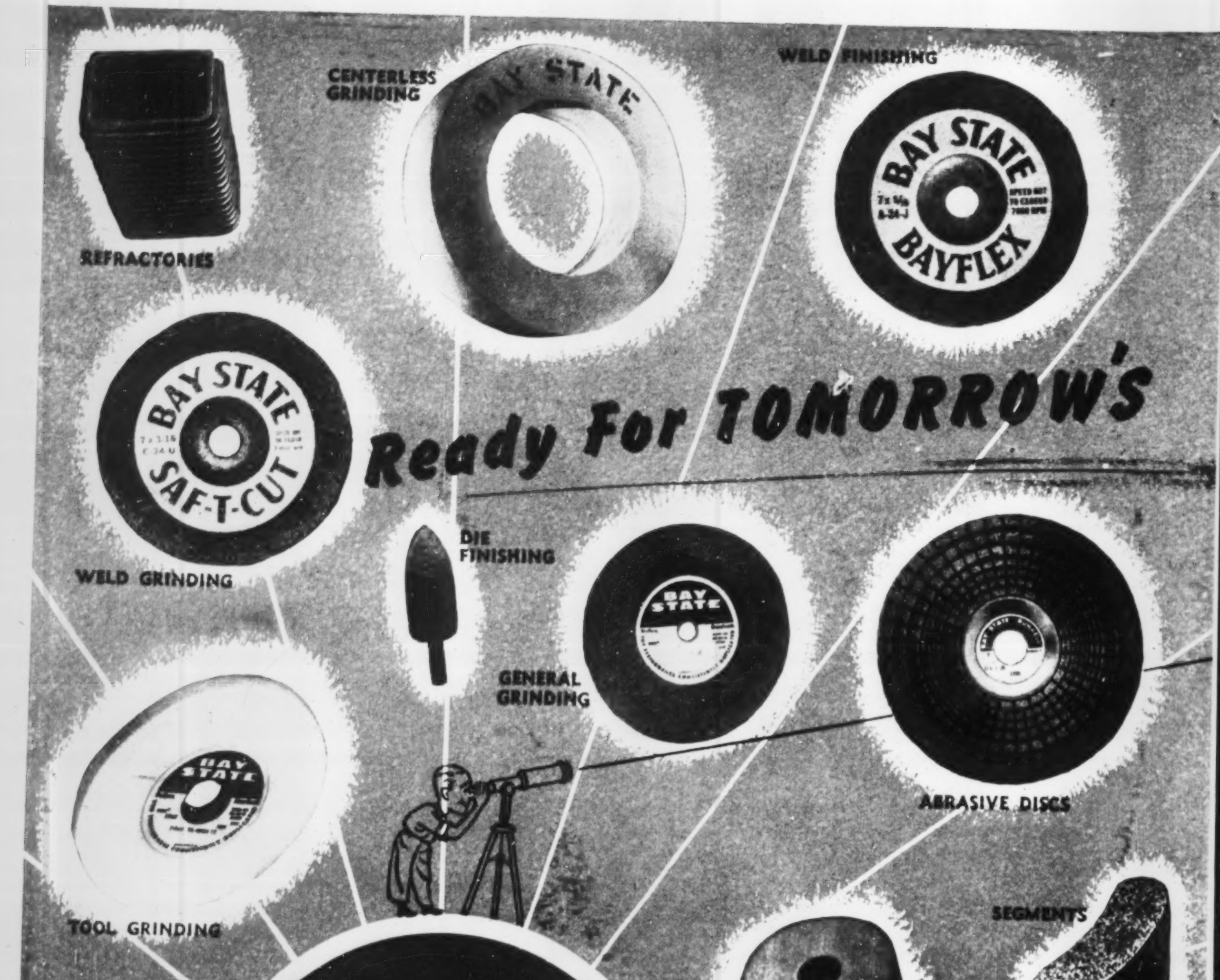
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Ready For TOMORROW'S
WELD GRINDING
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BAY STATE No. 320 GRITCLOTH
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Looking Ahead,

BAY STATE sees faster production speeds, more highly-specialized tools, tougher and harder alloys, still greater precision and finish requirements in grinding.

All these things, taken together, spell PROGRESS, and each one calls for BETTER GRINDING. That's where BAY STATE fits into the picture.

BAY STATE'S experienced personnel, advanced production and manufacturing techniques, CONTROLLED POROSITY, FRACTIONAL GRADES, modern equipment, extensive research . . . all are geared to that one purpose of bringing you BETTER GRINDING, through better abrasive products.

That's why in the future, as in the past, BAY STATE abrasive products will continue to set production records and bring profitable grinding to their users.

That's why you should let us show you what we mean when we say:

YOU CAN GRIND BETTER WITH BAY STATE

BAY STATE ABRASIVE PRODUCTS CO.
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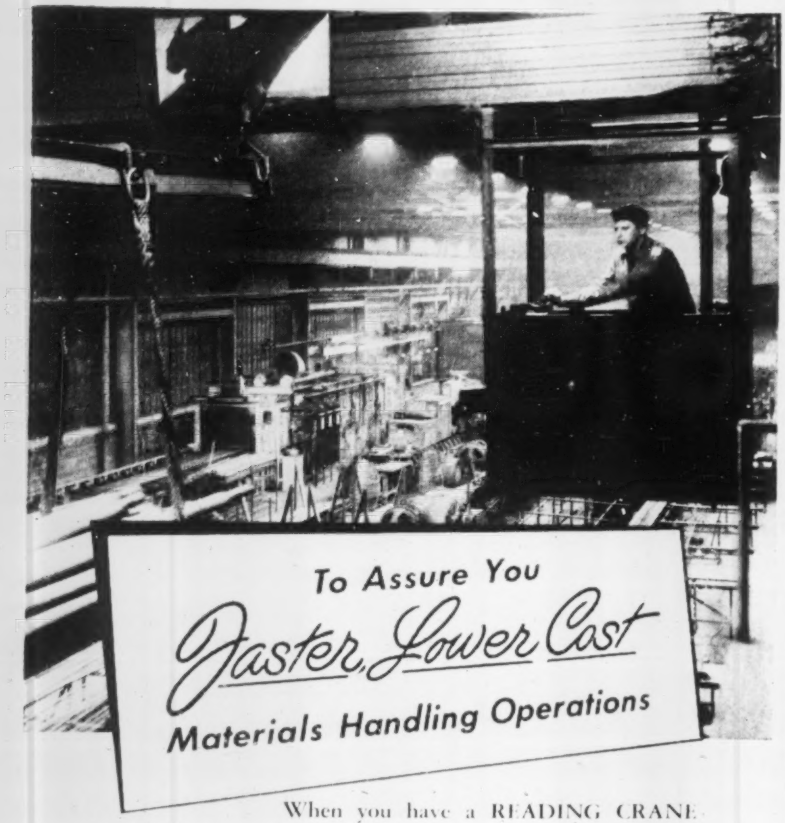
Chicago, Cleveland, Detroit, Pittsburgh
Distributors — All Principal Cities
In Canada: Bay State Abrasive Products Co. (Canada) Ltd., Brantford, Ont.

READING CRANES ARE CUSTOM-BUILT



When you have a READING CRANE installed in your plant, you get a crane CUSTOM-BUILT to meet your specific materials handling operation—at no added engineering cost!

Known as UNIT DESIGN, this unique method of crane construction reduces your costs in two ways:

1. LOWERS FIRST COST—Because READING CRANES offer you a choice of several interchangeable motor, control, and hoisting units, you buy no "extras" to solve special handling problems.
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See your distributor for information on how you can get a READING CRANE "tailor made" to your own specifications. Drop us a line for your free copy of "The Why and How of Faster Production".

READING CRANE & HOIST CORPORATION 2102 Adams St., Reading, Pa.

READING CRANES

CHAIN HOISTS
OVERHEAD TRAVELING CRANES
ELECTRIC HOISTS

into aircraft parts. Each bar is completely tested by moving the reflectoscope searching unit over one end. Other metals can be tested similarly.

Tells Thickness—Ultrasonic reflectogage is used to measure thicknesses of metals and other materials, up to four inches. It will also test for lamination and lack of bond. Readings are instantaneous. Hollow steel propeller blades are held to close tolerances during grinding by measuring wall thickness with the reflectogage.

Progress Being Made—Makers of ultrasonic test instruments are looking in the direction of refinement of existing techniques and making automatic such functions as handling and scanning of materials and recording of results. Both higher and lower ultrasonic frequencies are being investigated with respect to inspection cost as well as equipment performance.

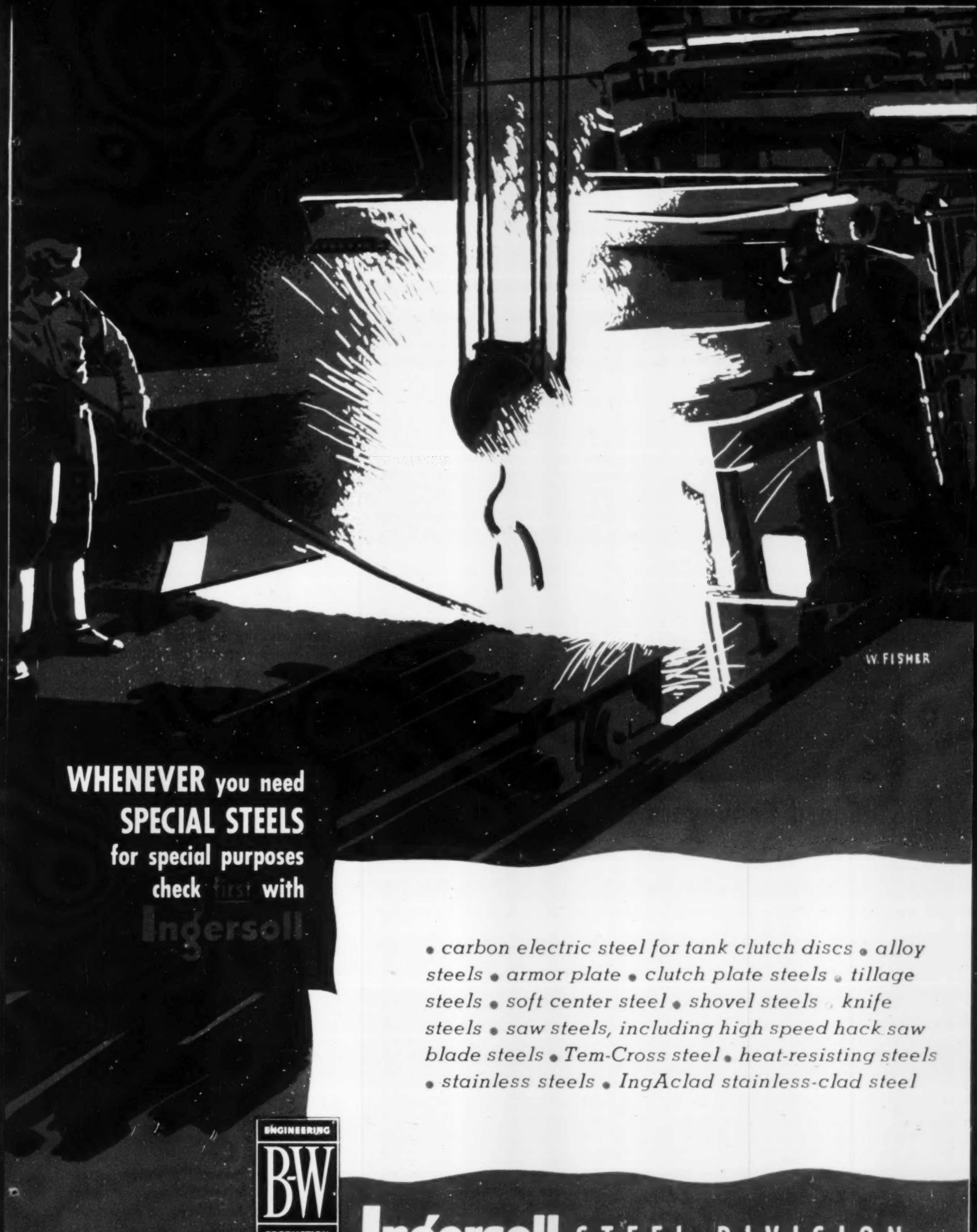
New techniques, whereby ultrasonic waves are produced which travel in regions near the surface of materials are now being field tested. These waves follow the surface even where the object being tested has moderate contours. This offers a means of ultrasonically examining parts previously impractical to test.

Another technique receiving more attention than formerly is the use of a liquid bath in which the object to be tested is immersed. The liquid serves as a coupling medium between transducer and work piece, reducing in some cases surface preparation requirements.

These new techniques will not replace existing methods. Rather, they will expand the choice of testing methods so more tests will be available to suit particular inspection problems.

Magnaflux—This name has become synonymous with magnetic particle testing. The basic equipment includes convenient facilities for setting up suitable magnetic fields of proper strength and in the correct directions.

Machines Do The Work — Past year saw the development of more special semiautomatic or automatic equipment for rapid and economical inspection of parts.



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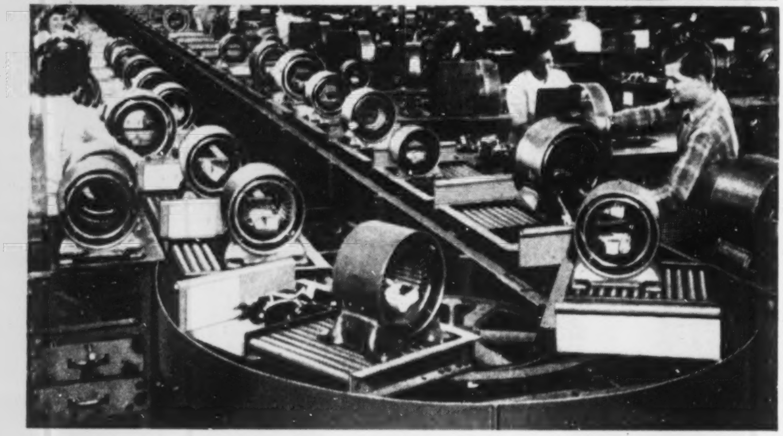

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Your needs in conveyors — ranging from power and gravity conveyors, roller, belt, slat, chain, push-bar, sectional — to portable, self-contained conveyors — spiral chutes — pneumatic tube systems — can be met at Standard, with a conveyor experience record of more than 45 years. Write — Address Dept. ST-13.

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INSPECTING AND TESTING

Automatic units were built for volume inspection of jet engine compressor blades. Operator places a blade on the blade holder and depresses the foot switch. Blade is automatically moved into the magnetizing station where it is clamped, sprayed and shot, then unclamped and retracted to the loading position where inspection facilities are provided. The entire sequence is automatic.

New Twist—These machines use a new development known as swinging field magnetization. It combines longitudinal and circular magnetization in one operation. It thus enables the operator to inspect for defects in all directions with one magnetizing operation and one inspection.

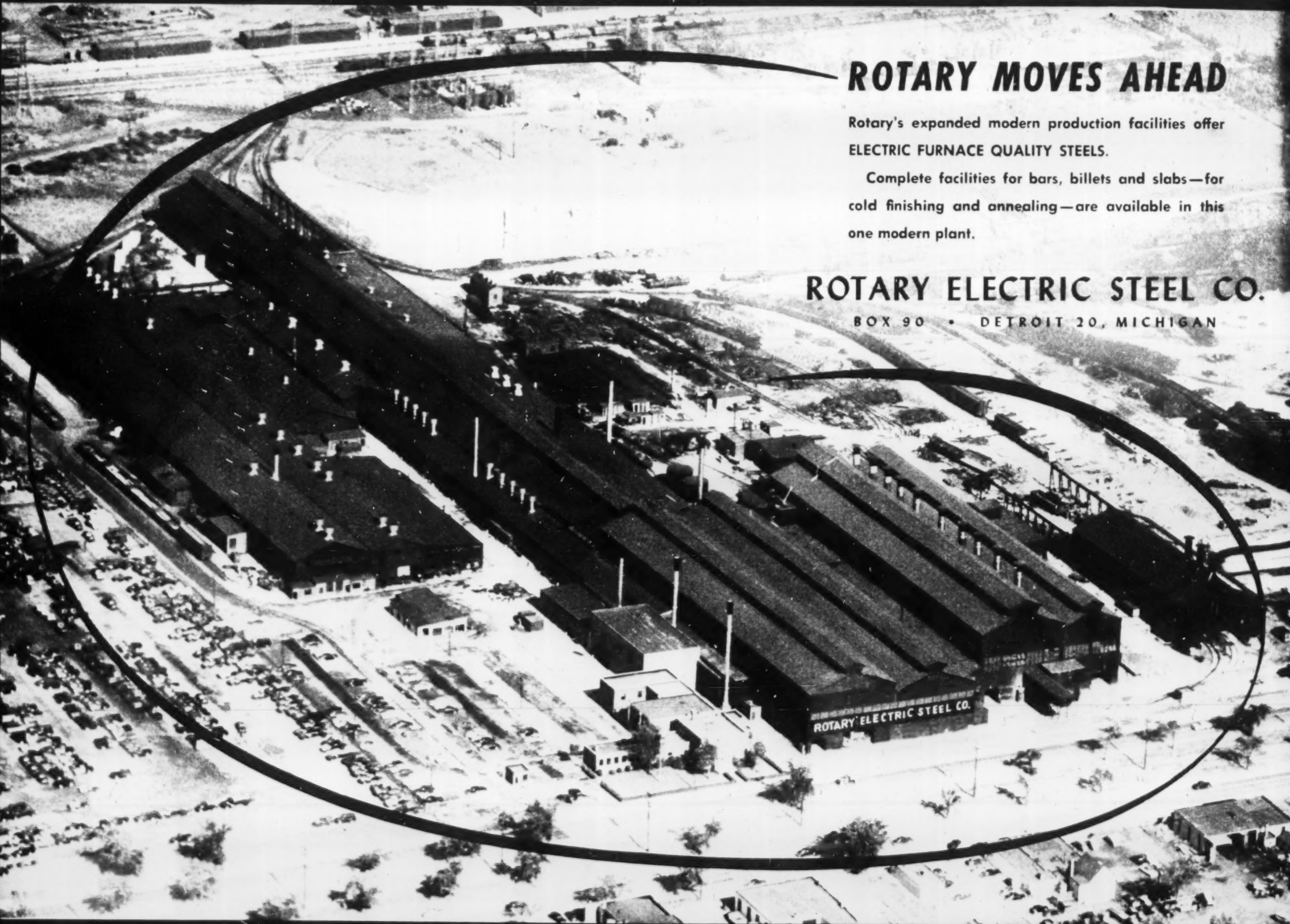
Another Way—Penetrant method is a useful test for revealing surface cracks, pores, leaks and irregularities. It also works with nonmagnetic materials.

One form of this test is known commercially as Zyglo. It is a fluorescent penetrant inspection which utilizes black light to show up defects. Semiautomatic Zyglo units were put in operation last year for volume inspection of jet engine turbine buckets.

Automatic Too—In this machine turbine buckets are treated with Zyglo penetrant by the tray-full. Bar chain conveyor takes them through a tunnel where penetrant is automatically washed off with water spray, developer is then applied, and buckets are dried. Conveyor then feeds them to inspectors under black lights in hood, where quick viewing finds any crack-like defects marked by fluorescent Zyglo indicator.

Electromagnetic-Induction — A number of worthwhile inspection and test methods have been developed on this principle. However, they generally have to be engineered for each specific job.

One type of such equipment is used as a sorter for machined parts and materials. Another is used for testing welds, particularly longitudinal seam welds in tubes. Still another is engineered to detect superficial cracks in wires. This principle will undoubtedly find wide application in the future.



ROTARY MOVES AHEAD

Rotary's expanded modern production facilities offer ELECTRIC FURNACE QUALITY STEELS.

Complete facilities for bars, billets and slabs—for cold finishing and annealing—are available in this one modern plant.

ROTARY ELECTRIC STEEL CO.
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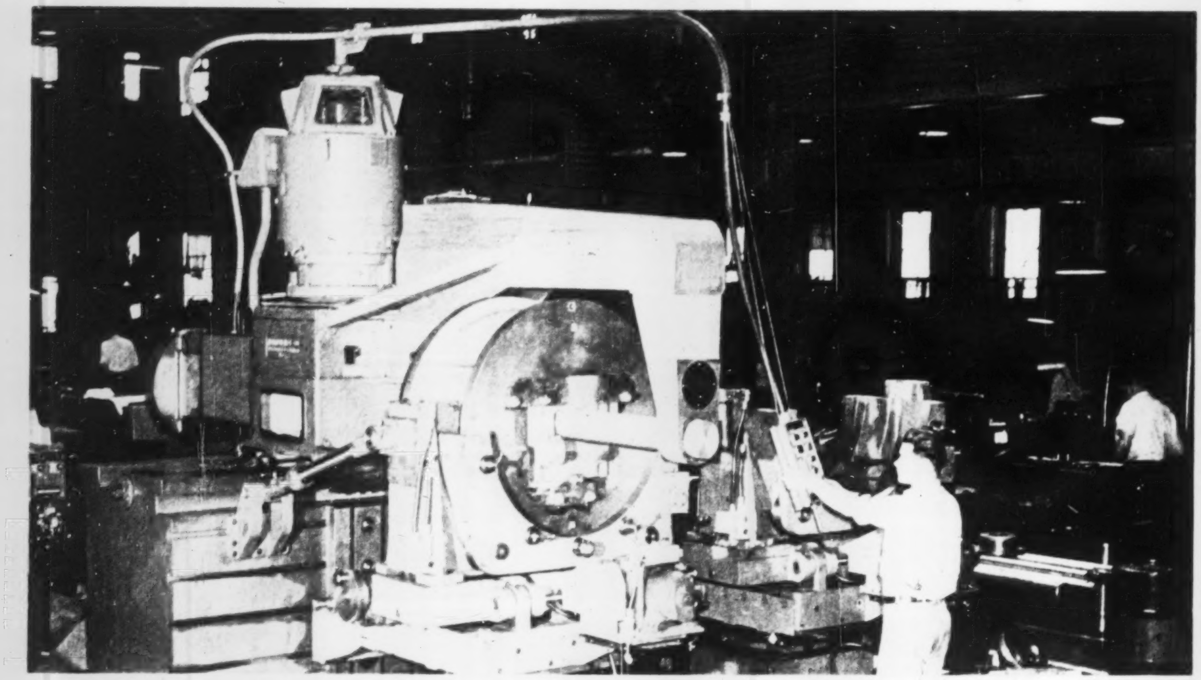


Full cutting power and rapid reversal with this draw-cut shaper typifies the growing number of applications for variable speed drives

FORUM ON TECHNICAL PROGRESS

Drives and Controls

Big challenge to drives and control builders is the demand of an expanding economy for faster, more reliable tools of production. Packaged variable speed drives look like the answer

ECONOMISTS predict that if industry is to keep up with our growing economy it will have to expand its productivity by an estimated 45 per cent in the next ten years. Already feeling the pinch of a manpower shortage, industry is forced to seek the answer to this problem in the machines of production.

Since better than 90 per cent of all the machines in America are driven by the horsepower of the electric motor, it is natural for production men to look to this basic tool for a possible solution to their problem. But with six decades of design perfection behind it, the motor itself is not likely to undergo radical changes but will be subjected to continuing improvements and refinements. Gains will come through better utilization and integration of motor drives.

A Universal Motor?—The trend seems to be toward a single, completely enclosed, self-cooled motor that can be used for general applications and can further be used for most of those applications now requiring special enclosures.

Along with this trend is the demand to reduce physical size of motors. New materials, better ventilation and construction techniques will make possible that reduction. Silicone insulations will permit further size reduction if temperatures are allowed to rise, but here the limiting factor would be the heat resistance of the bearing lubricants. Research engineers report excellent progress on this problem.

Motor Uprating—In November, 1952, the National Electrical Manufacturers Association approved new standards for 1800 rpm, open-type motors, 1-30 hp, that will pack more horsepower into a given frame size. Additional standards will be announced this year.

These standards will be taken into consideration by machine tool builders in designing new models for their 1955 show, as well as by makers of a myriad of other types of equipment.

Automatic Plants — The automatic plant for repetitive or high-volume products is not far in the future—in fact, it could be built today from known components. Drives for these plants will require motors with windings of extremely high reliability. It is still the motor designer's dream to be able to design a motor that will not burn out or fail in some other manner.

Predictable life windings are not out of the realm of possibility with existing known materials. Engineers have not as yet been called upon to design for low probability of failure over a given time, but it can be done. Bearings too, will require redesign to provide predictable life.

Adjustable Speed Drives—Need is reported for a low cost drive, adjustable in speed over a wide speed range, up to a ratio of several hundred to one and subject to precise control and regulation. Lack of such a drive explains the continued demand for and use of the dc motor, where adjustable speed is obtained through the use of field and armature control.

While several manufacturers are producing variable speed drives which are compact and have good speed ranges, demands of machines not yet dreamed up for the future are even now spurring these manufacturers to extensive research efforts. It would seem that development of a superior and compact static or tube-type frequency converter plus a variable frequency, high efficiency induction motor might challenge the position of the commutator as a wide speed control device.

The auxiliary conversion equipment required for dc machine operation has always been a deterrent to its use, but the expanding use of variable speed equipment will keep dc motors in the picture. Tomorrow's dc single motor drive will probably have the rectifier and control built directly into the machine frame so that each unit will be self contained requiring only ac power for operation.

Emphasis On Control — White hope of the nation's production team is the steady stream of new developments in the control side of the drive picture. As processes grew in complexity, control functions were introduced that no human operator could ever be expected to perform. Multiple drives were introduced that required coordination of their actions. Complicated duty cycles appeared—machine speeds were increased enormously—precision operation became essential.

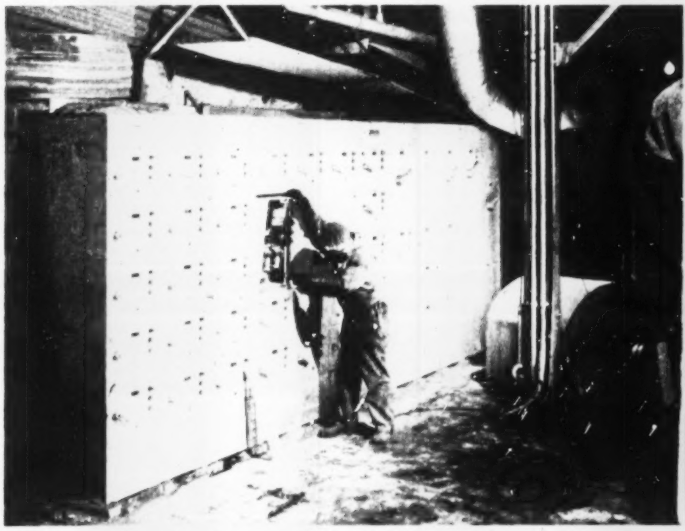
Industry, under continuous pressure to increase output, calls for more intricate and precise drives. Yet, in the interests of maintenance, reliability and cost, the control engineer is asked to make them simpler. Seemingly, these are contradictory orders but much in this direction has been accomplished.

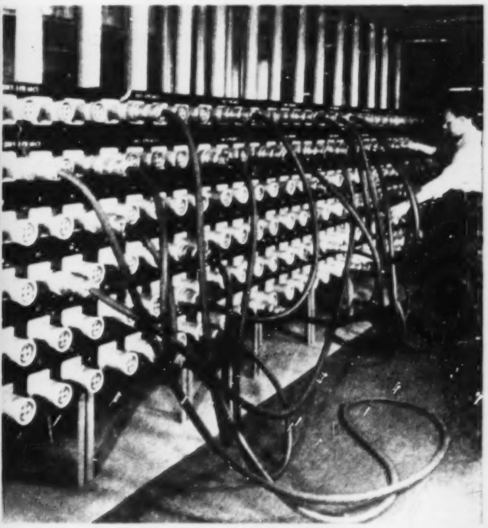
Labor Savers—Centralized group control development puts all starters and circuit protective devices in one location, away from the tinkering of unauthorized personnel. All the motors in a line, process, or whole plant can be controlled from one place.

Sectionalized bus duct carries current requirements to all parts of the plant; move a line or process to another section of a plant, and the bus can easily be rearranged to fit the needs. Some shops having many varied current requirements set up distribution boards with plug-in receptacles for dc, ac, 3-phase, 25 to 60 cycle, or other types of power take-off.

Servomechanisms — Application of servomechanisms to the metal-cutting industries has taken on definite form during the last year, pilot installations have been completed on gear shapers, lathes and grinding equipment.

Introduction of packaged-type, plug-in units provides accelerated interest in this type of control device as it is no longer necessary to have a control unit idle for extended maintenance. Finding the trouble is similar to testing lights





Group centralization of motor control puts starter and circuit protective devices in one location, away from the tinkering of any unauthorized plant personnel

Plants requiring many and varied current services are turning towards this type of distribution board. This one carries 100 numbered receptacles

WILLSON
Established 1870

Plastic Protective Equipment

Because Willson safety equipment is made after careful study of industry's needs, you get all the comfort and safety improvements *first* in Willson products. The complete Willson line of safety equipment includes more than a hundred face, eye and respiratory products for industry, farm and home—the most complete selection of safety equipment—and you can get them anywhere!

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SAFETY SPECTACLES
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THE WILLSON MONOGOGGLE®

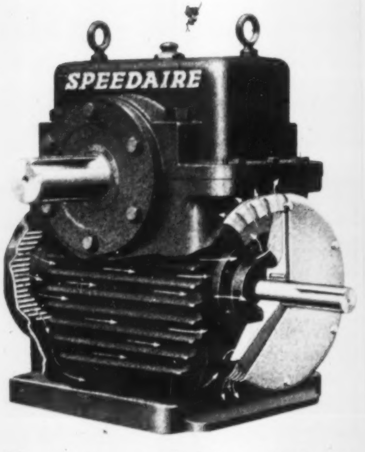
—plastic eye protection that keeps your eyes safe from the front and sides, as well as providing wide angle vision! Flexible plastic frame gives you lightweight comfort. Fits over spectacles. Lens is replaceable. You'll like the MonoGoggle®!

See your WILLSON distributor or write for catalog

WILLSON PRODUCTS, INC., 233 Washington St., Reading, Pennsylvania

on a series Christmas tree light string; the first unit in the circuit is pulled out and a spare plugged in. If this does not correct the difficulties, the second unit is similarly tested, and so on until the control is again operational.

Magnetic Amplifiers—The magnetic amplifier principle has been known and used for years, but not until the development of high-permeability core materials and improved rectifier elements such as selenium and germanium could the large power amplifications be obtained. Automatic feedback control systems and these high power amplifications make it possible now to realize the full potential of this device.



Worm gear speed reducer that doubles capacity without increasing the size has recently been made available

Controls can be built smaller and ligher, and as the magamp is a static, rugged device, it can be designed to withstand high shock and supplant tubes in many critical applications. Further development of magnetic steels will result in improved performance and still lighter weight.

Faster, Better Machines — Advances in motors, drives and regulating equipment will make it possible for progressive designers to develop machines that will accomplish more in less time with less human effort more efficiency and safety. But power transmission machinery is an important factor in the equation, too.

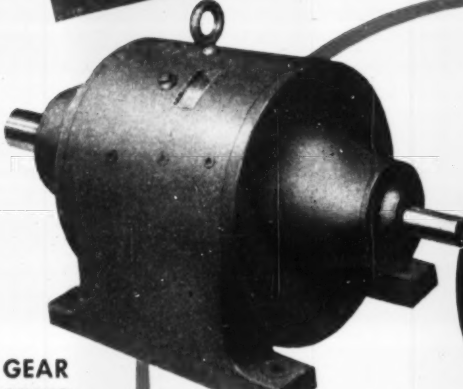
Significant is the expanding use

Established 1888

D.O. James

CENTRALLY DRIVEN BALANCED DRIVE
With Great Emergency Strength

GEAR
SPEED
REDUCERS



GEAR
SPEED
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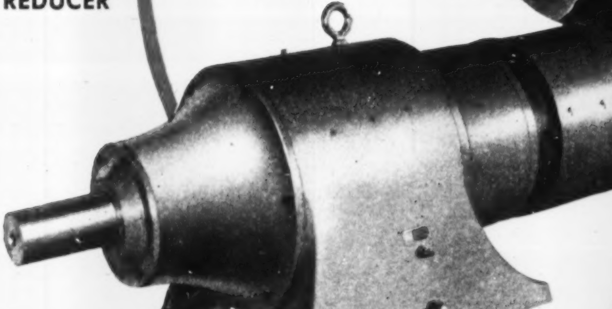
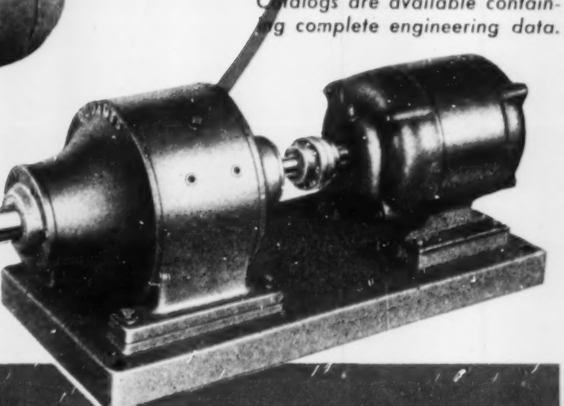
ELLIPTOID (CROWNED) TOOTH
EXAGGERATED TO ILLUSTRATE
PRINCIPLE INVOLVED

Multiple tooth engagement, low tooth stresses, with high load capacity and high wear factor. Gears are heat treated, shaved and crowned (Elliptoid), equally balanced and revolving in same direction, quiet operation, long gear life, and highest efficiency.

Catalogs are available containing complete engineering data.

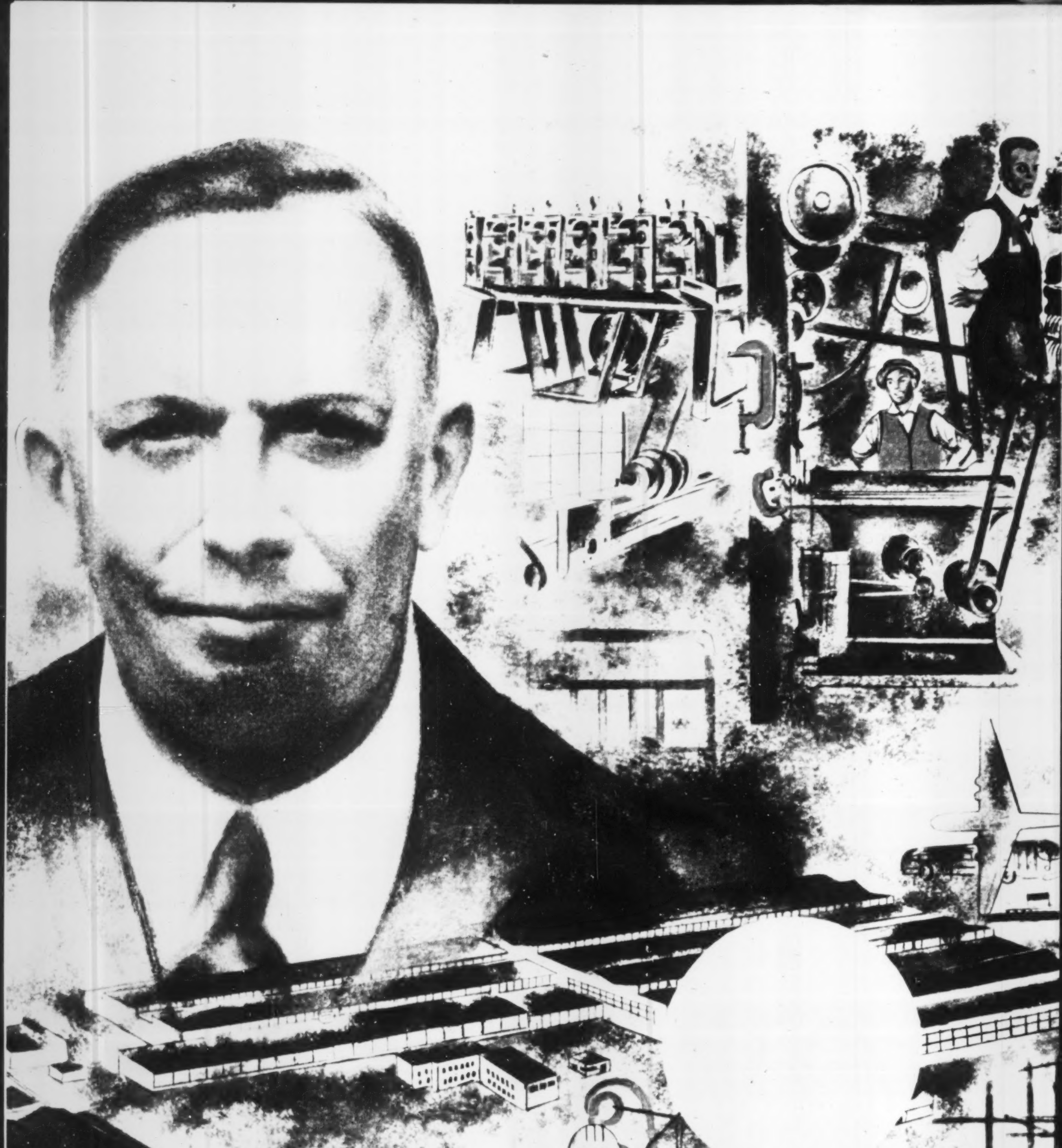


MOTORIZED
REDUCER



MOTOR REDUCER
A Packaged Unit

D.O.JAMES GEAR MANUFACTURING CO.
1140 WEST MONROE STREET • CHICAGO 7, ILLINOIS
Makers of Every Type of Gear and Gear Speed Reducers


VAN HUFFEL
SERVES
THE INDUSTRIES
THAT SERVE THE NATION

SCENE I A small frame shed on Mill Street—with Mishawaka, Indiana's sky line for a backdrop—set the stage for a drama of industrial achievement that could happen only in America. Here it was that Van Huffel designed and built its first "roll machine"—an ingenious five stand mill that started producing the plant's principal product: cold formed steel tubing for bedsteads.

achievement

★ This advertisement is published as a tribute to Isadore Van Huffel, founder and president, whose vision and achievements shaped the past, present and future of the company that proudly bears his name. It is also a tribute to the engineers, product designers and architects whose alertness to the unlimited possibilities of miracles in metal provides the challenge and inspiration for even greater effort on our part in the future.

SCENE II Today, the modern, integrated Van Huffel plant at Warren, Ohio produces metal shapes and tubing literally by the mile for every type of industry and product: bedsteads or bombers, window sash or washing machines, tractors or television equipment. The list is endless and new uses no longer surprise us here at Van Huffel—where ideas take shape in metal.

WELDED, LOCK SEAM, BUTTED TUBING • METAL SHAPES, MOULDINGS

Van Huffel

TUBE CORPORATION • WARREN, OHIO

when the job is tough . . .

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they preserve the tooth form

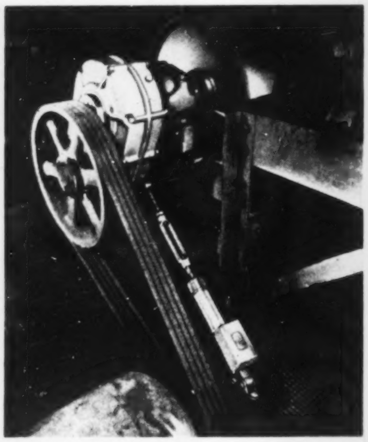
• "HARD-DUR" Gears not only preserve tooth form because the material is highly wear resistant and the gears are scientifically heat treated to obtain maximum physical properties...but they have involute teeth that are produced to high standards of accuracy by very careful workmanship. In fact "HARD-DUR" Gears are so much stronger, harder and more wear-resistant, that they are guaranteed to have at least four or five times the life of similar untreated gears...and at only 50% extra in cost.

THE HORSBURGH & SCOTT CO.
GEARS AND SPEED REDUCERS
5112 HAMILTON AVE. • CLEVELAND 14, OHIO, U. S. A.

Send note on Company Letterhead for 488-Page Catalog 49

of shaft-mounted speed reducers. They reflect a trend toward simplicity of design, smaller space requirements, faster and easier installation and fewer adjacent members such as foundations, rails and flexible couplings. Speed and horsepower ranges have been increasing steadily.

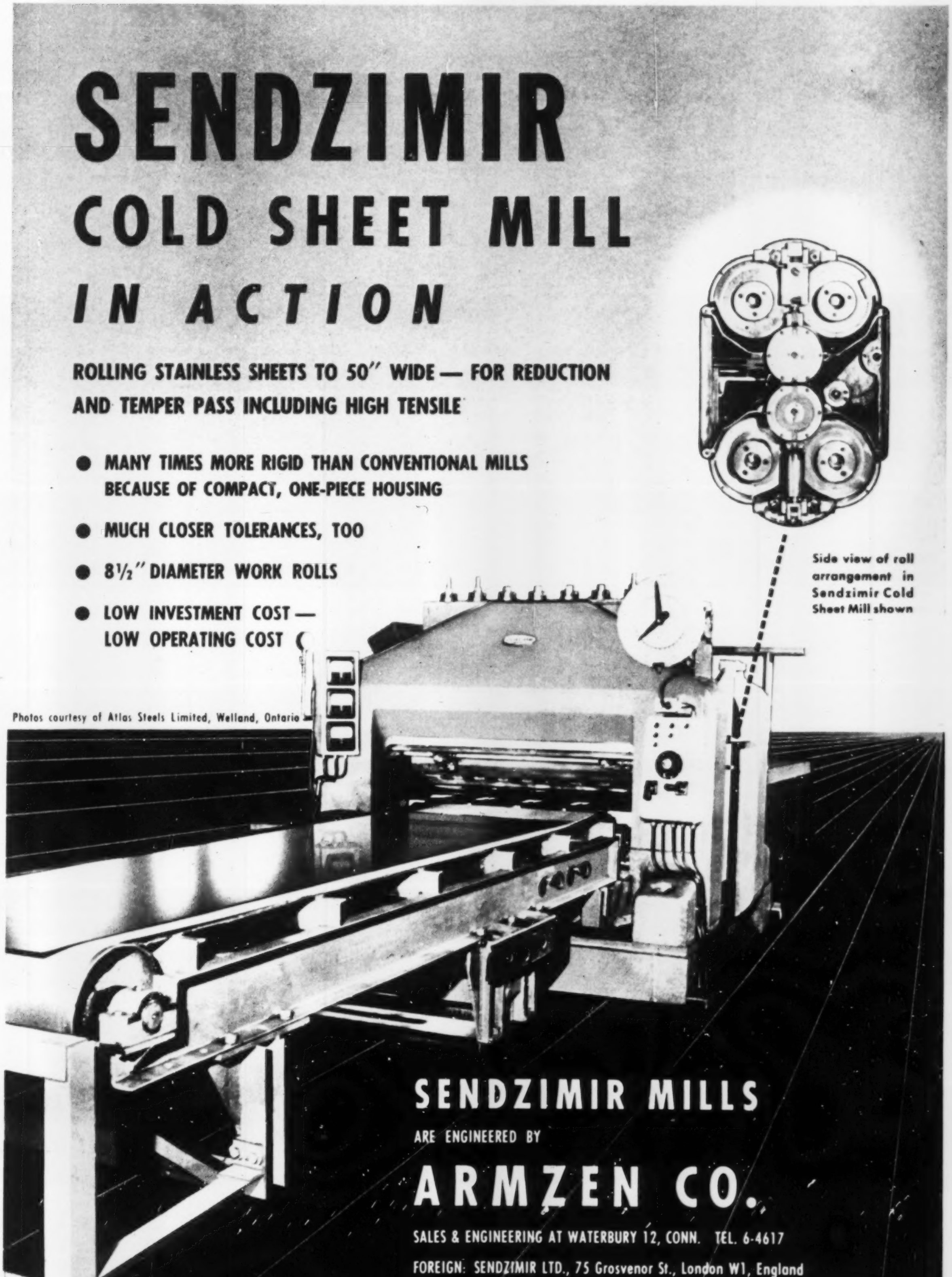
Worm Gear Trend—In the past 15 years the percentage use of worm gearing, compared to other types has doubled. It would appear that American designers are discovering, as their European brothers have, that worm gearing offers smooth, quiet speed reduction in limited space, high shock load characteristics, long life and large ratios of reduction in a single stage.



Typical of drive safety devices is this automatic load detector which releases overloaded conveyor belts

One company has developed a line of fan-cooled worm gear speed reducers that can be safely rated at approximately double the horsepower capacity of a standard worm gear reducer of equal size. A new design in vertically mounted reduction units is reported to provide much greater radial and thrust loading, and is available with shaft extensions either up or down.

Hydraulics & Pneumatics—In the field of hydraulic drive systems, universal transfer plates are gaining wider usage. Cored passages in the plates save yards of piping and fittings, reduce leakage troubles, and simplify maintenance.



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ROLLING STAINLESS SHEETS TO 50″ WIDE — FOR REDUCTION AND TEMPER PASS INCLUDING HIGH TENSILE

- MANY TIMES MORE RIGID THAN CONVENTIONAL MILLS BECAUSE OF COMPACT, ONE-PIECE HOUSING
- MUCH CLOSER TOLERANCES, TOO
- 8½″ DIAMETER WORK ROLLS
- LOW INVESTMENT COST — LOW OPERATING COST

Side view of roll arrangement in Sendzimir Cold Sheet Mill shown

Photos courtesy of Atlas Steels Limited, Welland, Ontario

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AR 3

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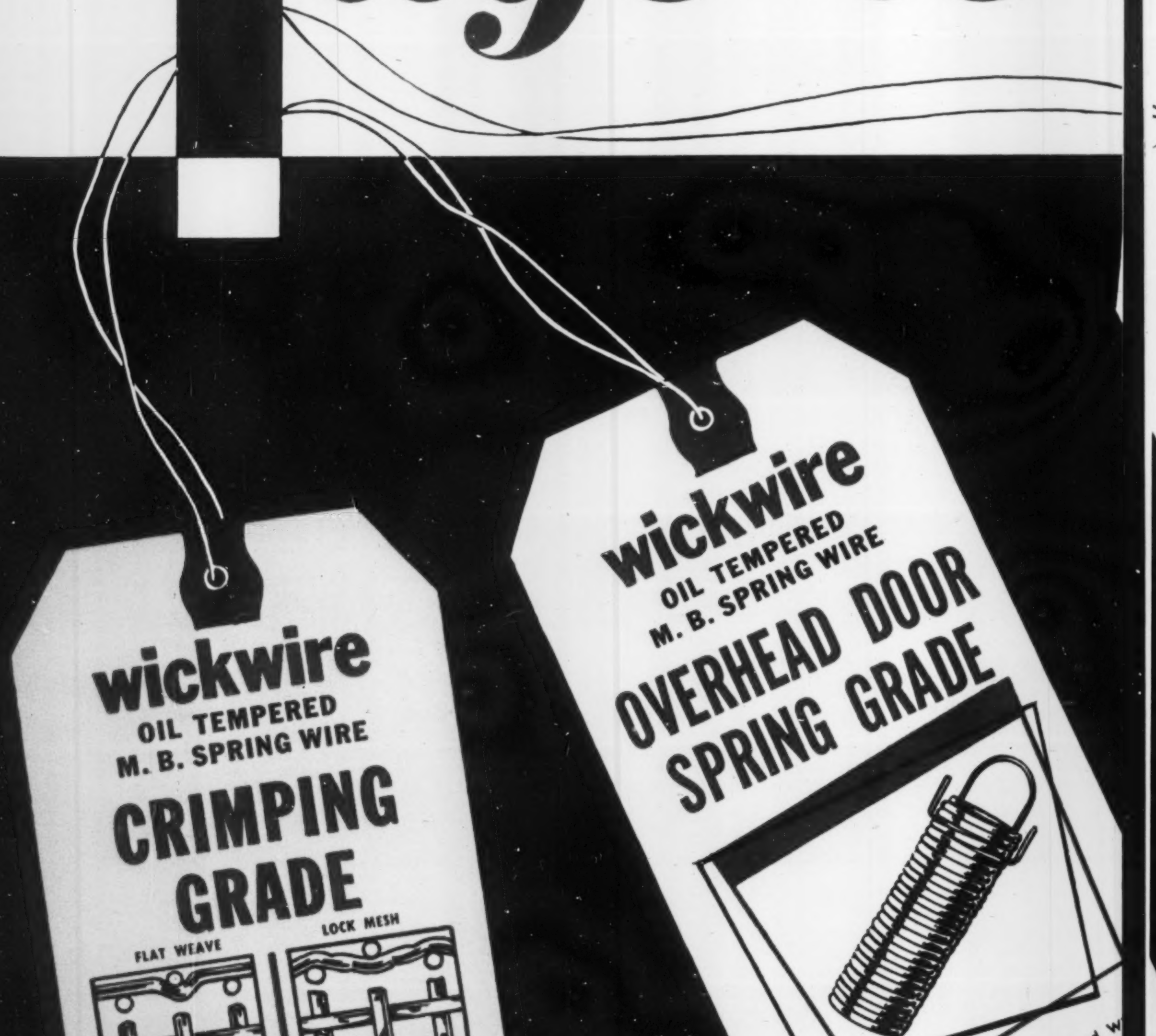
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OIL TEMPERED
M. B. SPRING WIRE
CRIMPING GRADE
FLAT WEAVE
LOCK MESH
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EXTRA CRIMP
We also manufacture Oil Tempered Wire for other applications including Mechanical Springs and Overhead Door Springs.
wickwire
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M. B. SPRING WIRE
OVERHEAD DOOR SPRING GRADE
We also manufacture Oil Tempered W
for other applications including Mechan
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Every tag on every coil of Wickwire Wire also carries the following specific information filled in on its reverse side: Heat Number . . . Size . . . Tensile Strength . . . Date . . . Coil Number . . . Test Sheet Number.

Thus, when you re-order Wickwire Wire you are always assured of consistent uniformity in the essential wire properties you require.

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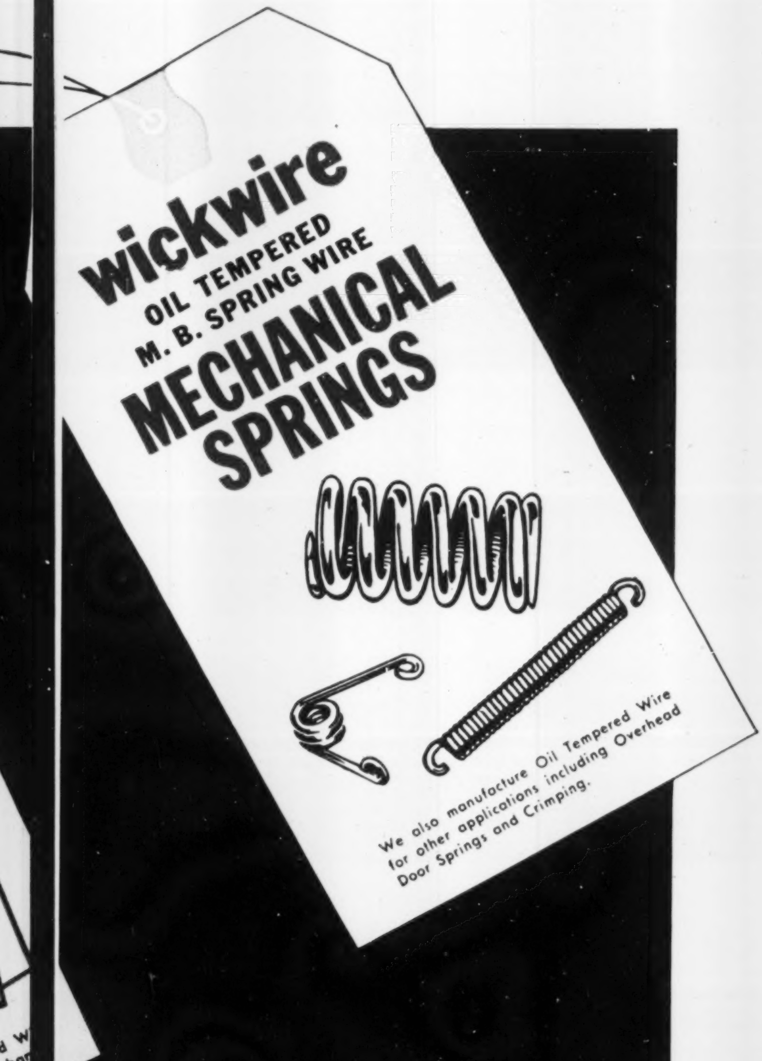
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when you order oil tempered wire

Every coil of Wickwire oil tempered wire that now leaves our plant bears its own distinctively colored tag; thus providing instant identification of its type and grade.

These new colorful tags, three of which are illustrated, help to simplify your job of inventory control . . . save the time of your stock personnel . . . and facilitate your re-ordering of Wickwire Wire in the correct type for your particular needs.

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Write or call our nearest sales office.

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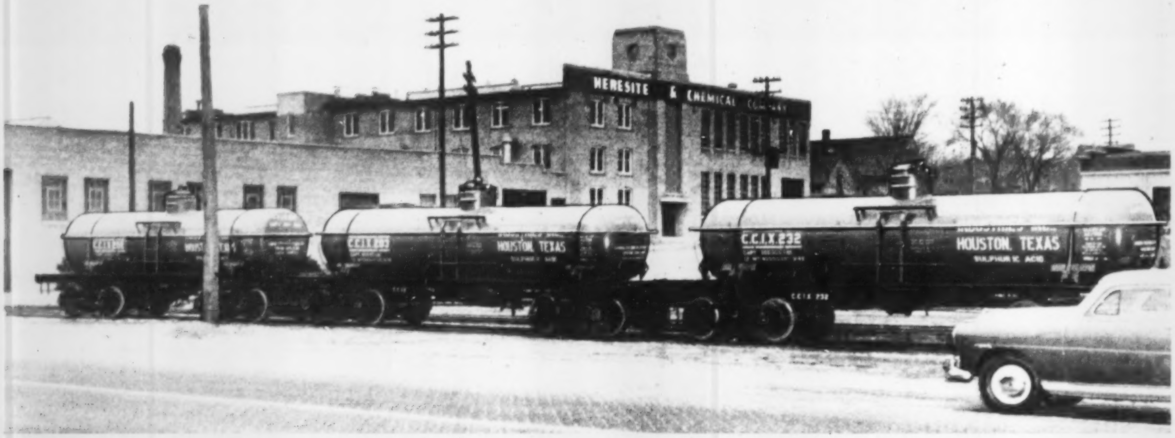
HERESITE

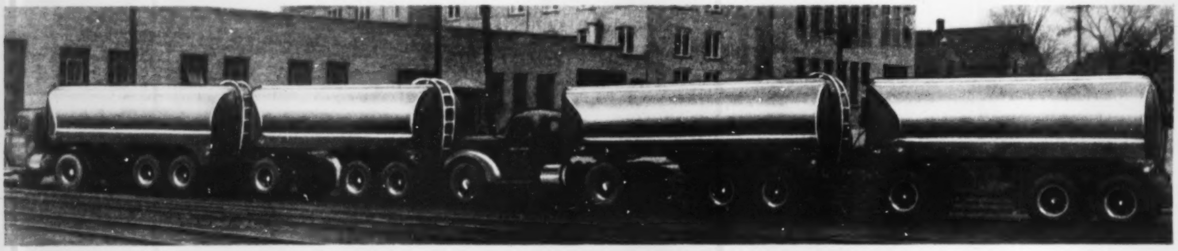
REG. U. S. PAT. OFFICE

LININGS FOR TANK CARS AND TRAILER TANKS



RESISTANCE—Heresite linings effectively prevent product contamination of such items as Sulphuric Acid, Rubber Latex, Formaldehyde, Battery Acid, Lactic Acid, Acetic Acid, Fruit Juices and Wine. These products can be delivered fresh and full strength, unchanged.

EASE OF CLEANING— Heresite lined tank cars are quickly cleaned by Steaming, Hot Water, or any type of Solvent Wash.



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SYNTHETIC RUBBER LINING
The strongest caustic hydroxide solutions, as well as the halogen acids and other chemicals, may be transported in a HERECROL lined tank car or trailer tank. Our literature will interest you. Write for it today.

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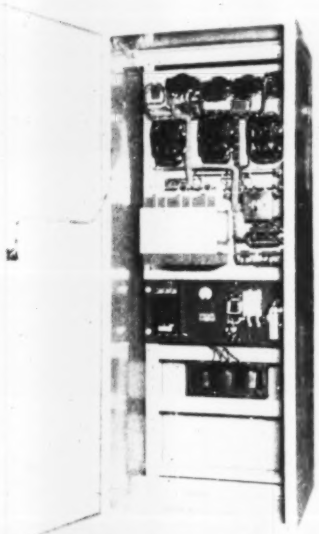
MANITOWOC, WISCONSIN

Trend in pneumatic drives is in the direction of smaller, lighter motors for hand tools, and a swing towards more low pressure systems. Air vises for holding work pieces during production operations are widely used, as are pneumatic positioning and transferring devices.

Other Trends — Compact, all-steel pillow blocks are gaining greater use. They require less space, weigh less and yet have bearing load capacity equal to those having cast-iron housings.



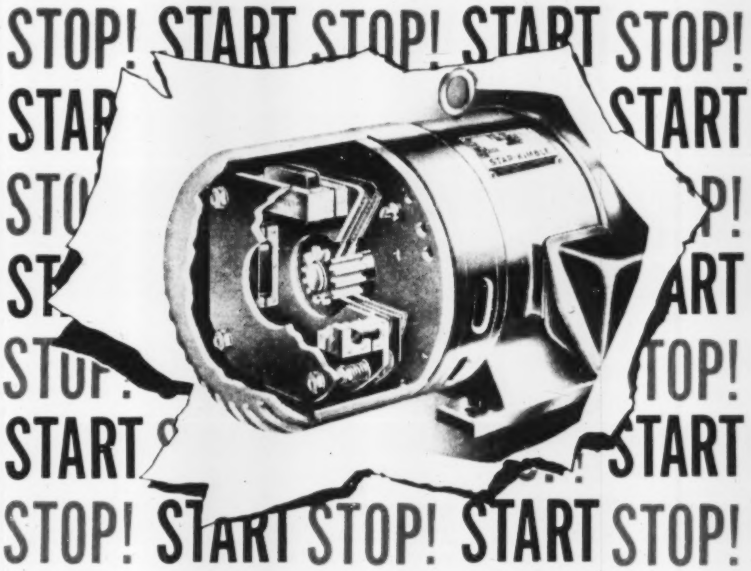
Automatic feedback control systems and high power amplifications promise big things for magnetic amplifiers

Spherical, self-aligning roller bearings are finding application in many geared drives. Instead of wearing down the soft bearing metal under heavy load, forces tending to deflect the shaft result in permissible misalignment to the inner race.

Faster machine speeds and more remote control of lines and processes has fostered the development of automatic safety devices which protect machine and worker in an emergency. This trend is bound to continue at an accelerated rate as more complete automation of plants become a reality. The more complex the machine, the greater the need for safety control.

Positive, split-second stopping

SMOOTH, NO-DRAG STARTING
FAST, NON-PLUGGING REVERSING


STOP! START STOP! START STOP!
START START
STOP! STOP!
START START
STOP! STOP!
START START
STOP! START STOP! START STOP!
STAR-KIMBLE

You get them all when you specify
Star-Kimble Brakemotors

NOTE THE EXTRA-LARGE BRAKELINING AREA—discs machined on both sides to give full, positive contact—that brings a Star-Kimble Brakemotor *and its connected load* to the same sure fraction-of-a-second stop through *millions of operations.*

NOTE THE SMALL AIR GAP between electromagnets and brake armature disc. It assures quick brake release—allows the load to start freely when the motor is energized.

COMPARE THE REVERSING CYCLE of a Star-Kimble Brakemotor and a motor reversed by conventional plugging. Typical figures on maximum starts per minute for a 5 hp motor: with plug stops, *three*; with the Star-Kimble way, *ten!*

REMEMBER a Star-Kimble Brakemotor is a compact, integral unit, with a short sturdy shaft that's common to motor and brake. Saves space—saves bearing and brakelining wear. One manufacturer—one responsibility.

For information on design and service features, write for Bulletin B-501-A

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MOTOR DIVISION OF
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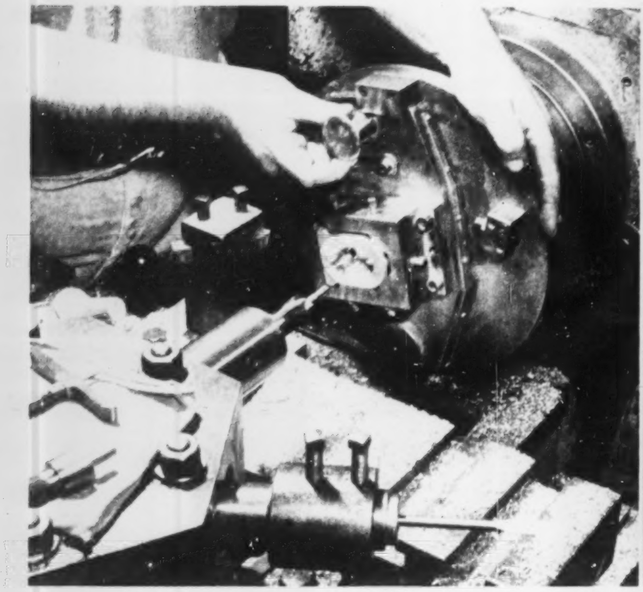
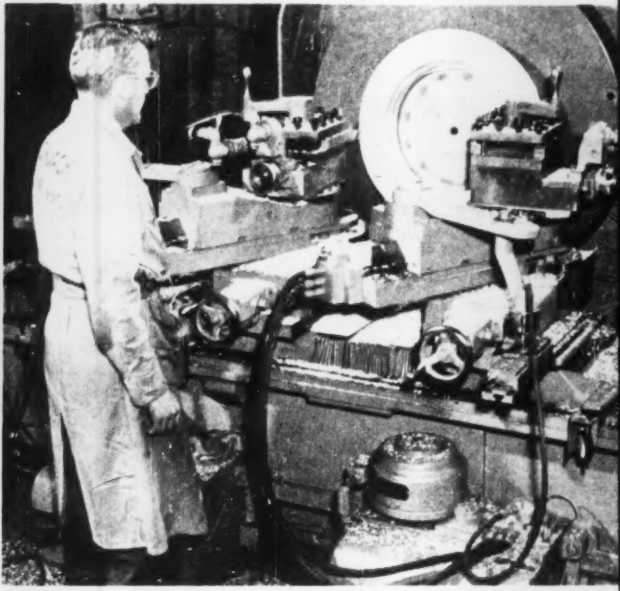
220 Bloomfield Avenue Bloomfield, New Jersey



Lathe fixture helps a standard turret lathe machine a special part. At Oberdorfer Foundries Inc., Syracuse, N. Y., fixture is swung to machine off-center bores



Right-angle lathe made by Monarch Machine Tool Co., Sidney, O. Machine was developed for work on jet engine parts. Both of the slides can be tracer controlled

FORUM ON TECHNICAL PROGRESS

Machining and Tooling

Machine tools are leading the parade toward automation. Even the standard machines will do more things, do them faster and with less man-effort than ever before

PUSH-BUTTON PLANTS, until very recently the subject of speculation and cartoons, may not be as far in the future as most of us thought. The strong leaning and the rapid advances toward what we now call "automation" have become part of a continuing evolution.

As always machining and machines are leading the parade. Still, the ranks are closing and other metalworking sequences, forming, materials handling and all the rest are striding briskly along.

Below the Surface—Underneath all this excitement and popularity, however, is a trend which has received little publicity, perhaps because it's not news. It is the constant demand from shops for the standard machine. This machine has been improved. It has more power, more rigidity, more automatic features. It's faster, easier to operate, more versatile and more productive than were its predecessors, but it's still the standard machine.

If automation means the reduction of floor-to-floor time if it means taking labor out of man's job and putting it in the machine then even the standard machines are leaning toward automation. Preselector heads, contouring devices and power feeds can all be said to contribute to this trend.

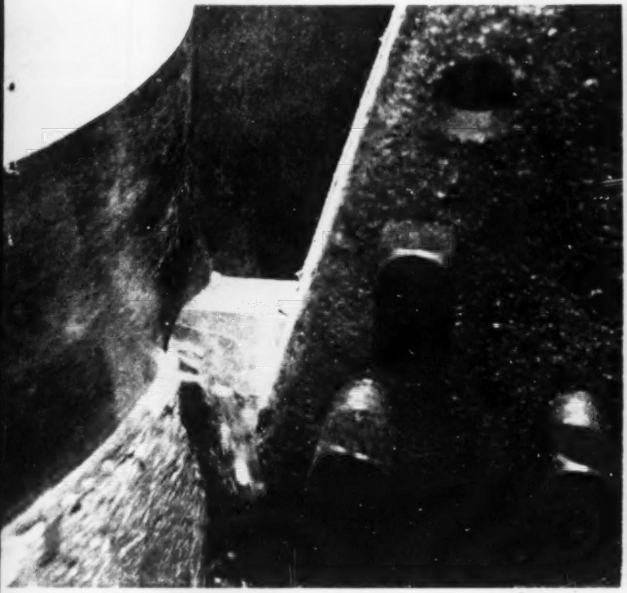
One for Many—Important fact is that the bulk of the machining industry has many jobs to run over each machine. The best machine tool in the world for versatility coupled to quality and quantity production is the standard lathe, boring mill, milling machine, grinder and all the rest.

Nevertheless there is still the increasing demand for special purpose machines. Most of these machines find their way into the heavy industries, especially automotive and aircraft.

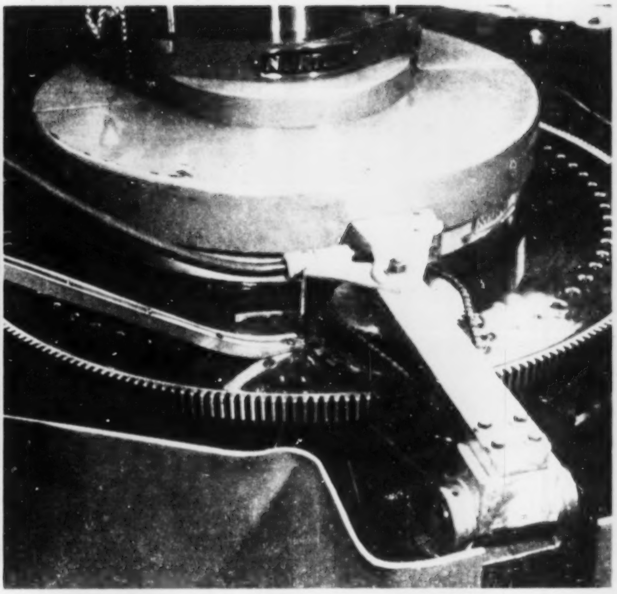
The Causes—Most potent of all catalyst in this automation reaction has been the defense program. Many companies are forced to produce defense items while still in business as usual on their regular products.

The other catalyst is rising costs taxes, labor and material. The only weapon with which to fight these is better methods.

All together—The trend of automation extends into every phase of



Carbide-tipped cutting tool hogs off scale from centrifugally cast jet engine ring at Cooper Alloy Foundry Co. Speed is 350 sfm at 0.010-inch feed. Cut is ¼-inch deep



Production is as high as 8000 pieces per hour with this work feeding mechanism on a lapping machine made by Norton Co., Worcester, Mass. Hopper feeds parts to laps

metal removal. Automatic transfer machines can place more than 100 separate machining operations under the control of one operator. Broaching, drilling, facing, turning, boring and many others can be included in the one operation.

Single and multiple-spindle automatic machines are widely used for both simple and complicated operations. The theory that mass-production and versatility are opposed has gone by the boards. Many such machines have experienced great improvement in the setup and conversion methods. It's now possible to have an automatic machine efficiently producing parts in lots as small as several dozen.

Scheduling — Cascading of jobs has aided in making automatic machines more versatile. Similar jobs are run in sequence with re-setup kept at a minimum.

Most special-purpose machines are capable of being readjusted to handle several different sizes and models of the same part. Much of the machinery which is now turning out defense items can be converted and profitably used for peacetime production.

Development of special purpose jigs and fixtures has greatly aided the achievement of production scheduling on intricate parts. Actually the use of a well-designed jig or fixture can be called automation since it reduces the hand locating and guiding in the machining operation.

Presetting—Tremendous strides have been taken in increasing the production of standard machine tools. Presetting of tools, also widely used on special purpose machines,aids in the diminishing of nonproductive machining time. With tools set off the machine and made ready for installation, setup and tool replacement time is drastically cut.

Machine tools with built-in inspection stations to insure quality are now commonplace. These mechanisms, in the future, will be expanded to cover more inspection operations.

More per Man—Increasing the productivity of the indirect labor that services machine tools now offers a fertile field for savings. Preset cutting tools discussed above is one good example.

Automatic lubrication systems have increased the productivity of lubrication crews, and automatic chip disposal systems have increased the productivity of laborers.

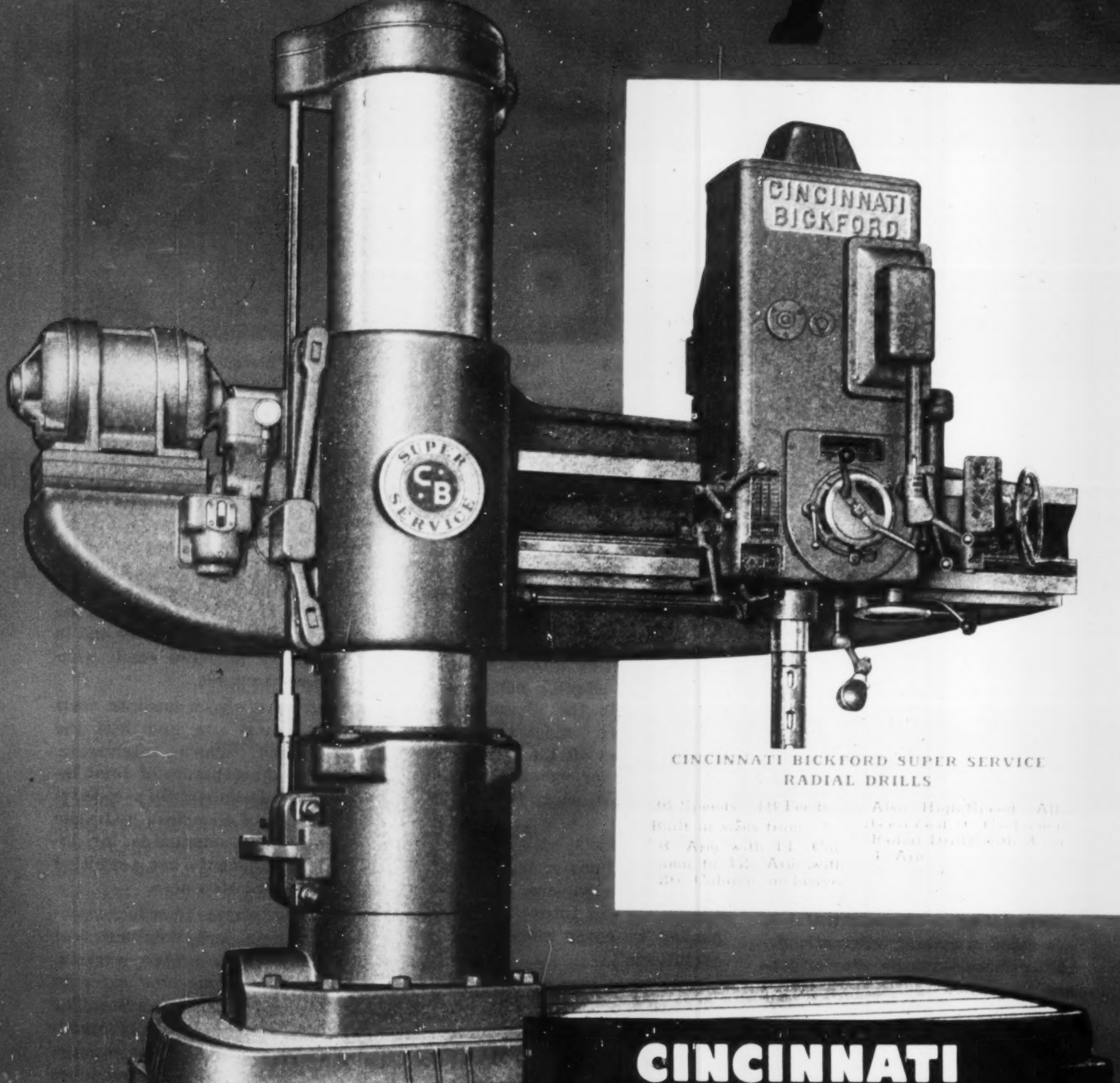
On Controls—The now conventional automatic functioning of grinding cycles keeps grinding abreast of the automatic trends. There is also an increasing awareness of the advantages in automatic truing of the grinding wheel, automatic control of peripheral grinding wheel speeds as the wheel is reduced in diameter and in wider range of more easily controlled work speeds.

Control panels on machine tools are becoming less and less the maintenance man's nightmare. Widespread acceptance of Joint Industry Conference (JIC) code a compilation of electrical, hydraulic and pneumatic standards for industrial equipment has permitted a big forward step here.

This code strives to reduce maintenance time and resultant lost production and to protect workers, by making the machine safer to operate and easier to service. The trend towards this kind of standardization plus greater maintenance serviceability of machines will benefit everyone concerned.

Pattern Follower—Use of contour machining devices has mushroomed in the past several years. Getting off to a fast start with the engine lathe it has now spread to include other methods of metal removal, notably in milling. This system of duplicating a pre-estab-

Leadership...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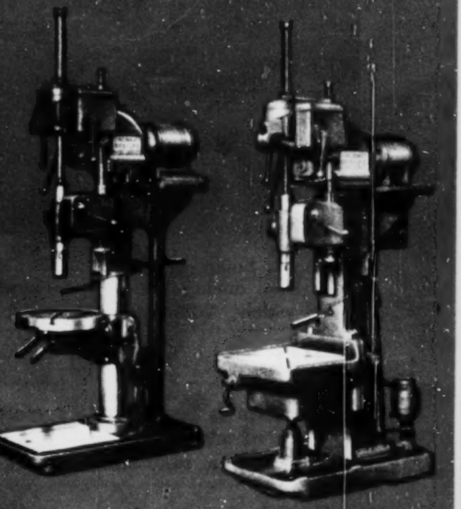
With eyes on tomorrow, Cincinnati Bickford looks ahead to new and continued developments.



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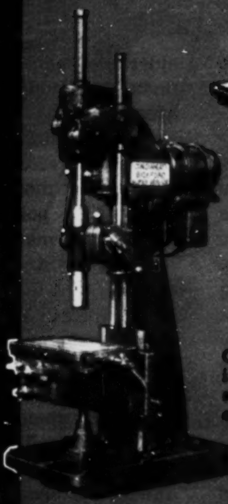
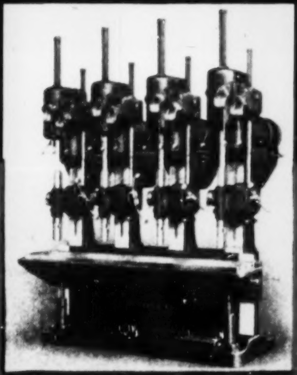
Built in 21", 24" and 28" sizes and with round or box column.



Compound table to facilitate layout work is available on 24" and 28" box column machines.



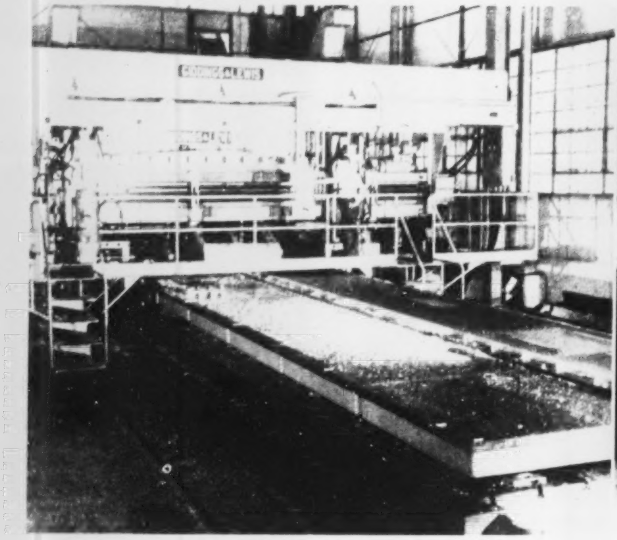
Gang drills having 2 to 6 spindles, speed successive operations on production work.

RADIAL AND UPRIGHT DRILLING MACHINES

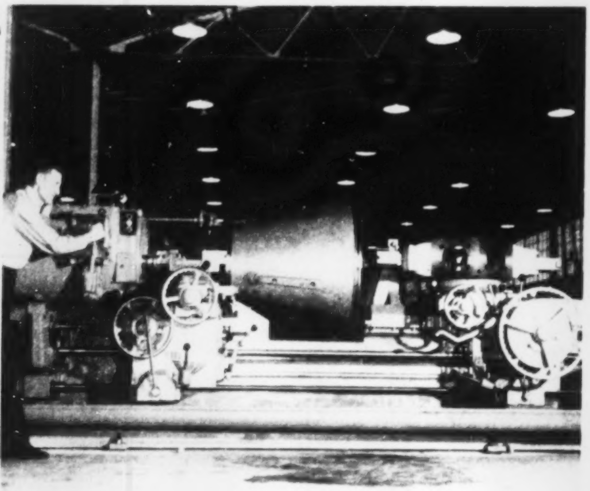
JIG-BORING MACHINES—PRECISION DRILLING MACHINES WITH SPACING TABLE

THE CINCINNATI BICKFORD TOOL CO.

Cincinnati 9, Ohio U.S.A.



Milling is being applied to new fields of metal removal. Skin milling of large aircraft sections is used more widely. Contour milling is also on the upswing



Gap bed of this Warner & Swasey saddle-type turret lathe permits swing of oversize jet engine cones. Another special feature is the cross-sliding hex turret

lished form is perhaps the perfect example of adding a form of automaticity to a semi-standard machine.

Coated abrasives have now become a full fledged brother in the machining family. This field has been stimulated more by acceptance than by any real new developments. What was formerly regarded as a finishing and polishing operation has gained a spot on the varsity metal-removal team.

Co-operative Effort — Acceptance, of course, stimulates development and participation. New machines, developed in joint efforts of the coated abrasive people and the machine builders, now handle jobs which a short time ago would have been considered out of the question for belt grinding.

Several really new machining and grinding processes have undergone significant development during the past year. They include the ultrasonic and the electromechanical methods.

New System — The ultrasonic method is an abrasive process wherein finely divided boron carbide is used to machine more or less brittle materials and relatively high strength materials. It's essentially lapping but the use of frequencies in the 16,000 to 29,000 cycle per second range in reciprocating the lap produces a considerable increase in the rate of metal removal per unit of active area in the lap.

Further the fact that the metal removal is effected by almost imperceptible movement of the lap makes it possible to machine shapes and materials that can't be handled by another cutting process.

A helical hole cut from the solid in tungsten carbide is a good example of the jobs that can be undertaken by this process. This initial equipment consists of an electrical oscillator and a transducer to convert the high frequency alternating motions. The lap or tool is designed especially for each application.

Diamond Saver—The ultrasonic lapping process shows promise for grinding sintered carbide cutting tools. Most of these tools are now ground with diamond wheels which are in critically short supply.

The electrochemical processes also show promise of easing the effects of the shortage of diamond grinding wheels. However, their use is restricted to the machining of metals only, since all of these methods require that the material being cut be able to conduct electricity. All of these methods are similar to the extent that the tool and the work constitute two terminals of an elecrical circuit separated by a suitable electrolyte or dielectric fluid.

Russia's System—One method removes metal by an electro-chemical reaction sustained by dc current where the work is the anode. Another employs arcing set up by either ac or dc current. This latter system is reported to be used extensively in Russia.

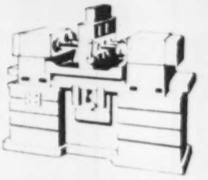
The metal is removed by fragmentation resulting from the very high stresses set up by the high temperatures in the arc. Overheating of the metal and precision control of the metal removal is achieved by mechanically quenching the arcs and through random distribution of a great many arcs of short duration and low intensity.

Special Purpose — The method can adapt itself to almost any shape of surface that needs to be machined. However, it is relatively slow compared to established methods of metal cutting and proves to be economical only for those jobs which can't be handled by conventional methods.

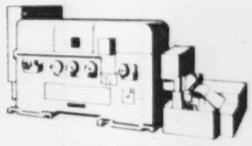
Both the electrochemical and the ultrasonic methods will find new applications and wider use in the coming year.

More Carbides—With the advent of high-temperature resistant alloys and their inherent poor machinability, there will be an ex-

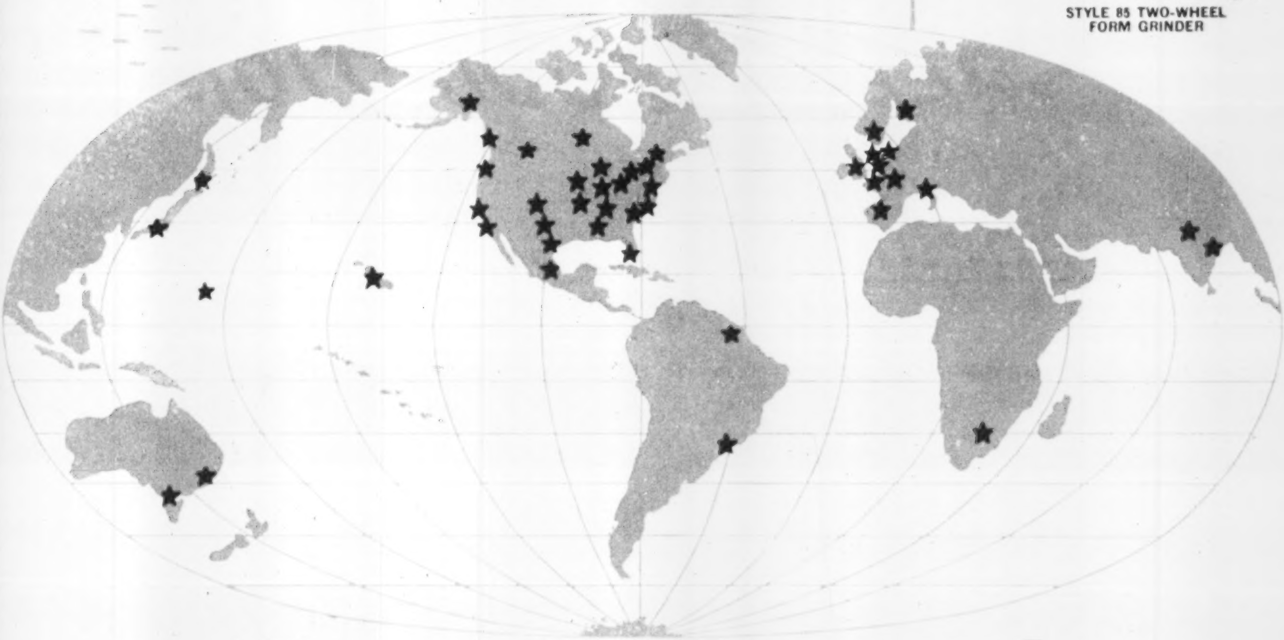
EX-CELL-O Products Are Used All Over The World

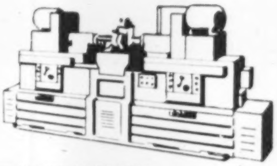


STYLE 17 PRECISION BORING MACHINE

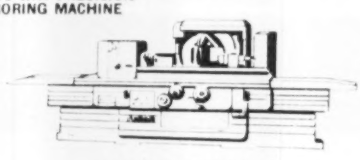


STYLE 85 TWO-WHEEL FORM GRINDER

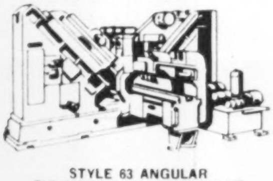




TWO-WAY PRECISION BORING MACHINE



STYLE 36 PRECISION THREAD GRINDER



STYLE 63 ANGULAR CYLINDER BORING MACHINE

"Made by Ex-Cell-O" is a familiar phrase in a dozen or more different languages. For Ex-Cell-O products are sold and used in every corner of the free world.

Almost as diverse as the countries in which Ex-Cell-O products are found are the products themselves. They range from machine tools to dairy equipment, from cutting tools to precision aircraft and miscellaneous parts, from precision grinding spindles to drill jig bushings. All are produced to the famous Ex-Cell-O standards of precision.

Not only are Ex-Cell-O products used the world over, but Ex-Cell-O maintains an extensive sales organization to serve both domestic and foreign markets.

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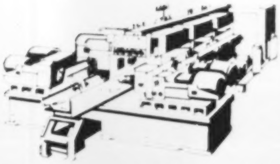
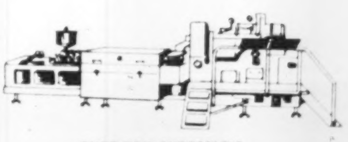
CORPORATION
DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT



SPECIAL TRANSFER MACHINE



PURE-PAK AUTOMATIC MILK PACKAGING MACHINE

220 Delpark FILTERS

SPEED PRODUCTION

AT

Continental Motors Corporation

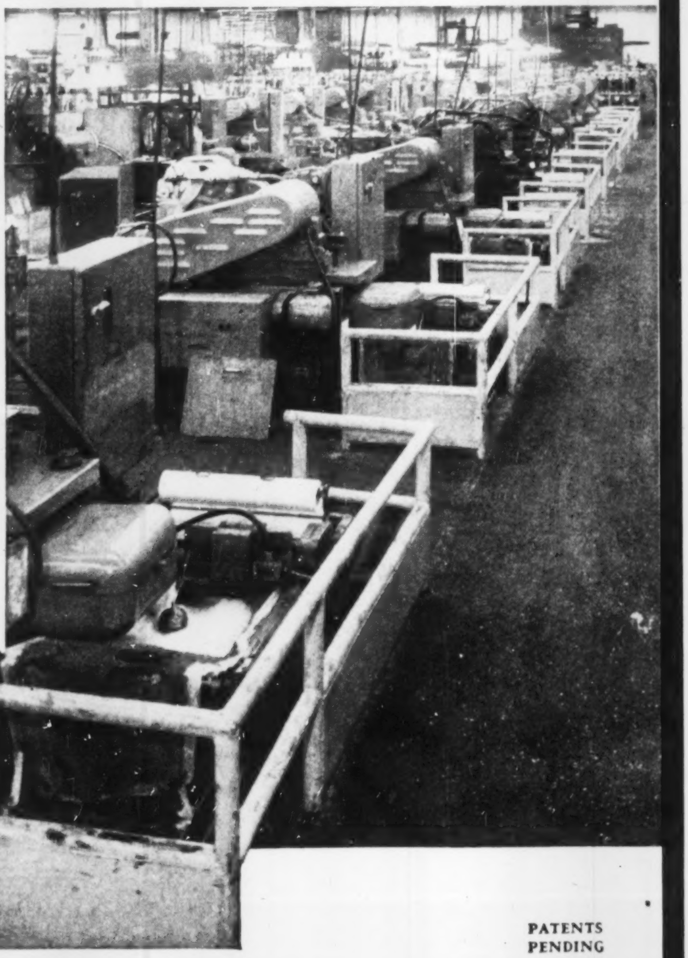
MUSKEGON, MICHIGAN

The value of clean coolants for grinding operations is certainly recognized by the Continental Motors Corporation in Muskegon, Michigan. Here, in the grinding department, 220 Delpark Filters remove swarf and wheel particles from the coolants supplied to Norton grinders.

Through the use of full flow, self cleaning Delpark Filters, clean coolant is supplied to the cutting wheel assuring a greater accuracy, less wheel dressing, greater machine efficiency, and lengthened coolant life.

If you have machine tools which require the use of soluble oils or cutting oils in machine operations, there's a place for Delpark Filtration to save you money, increase production, and improve machine efficiency.

WRITE TODAY FOR OUR NEW BULLETIN DESCRIBING THE FINEST IN INDUSTRIAL FILTRATION.



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INDUSTRIAL FILTRATION

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Visit our booth, Number 1830 at the Plant Maintenance Show, Cleveland, Ohio, January 19-22, 1953

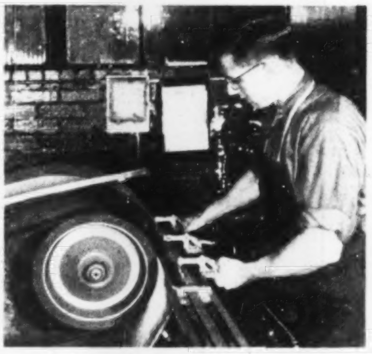
PATENTS PENDING

INDUSTRIAL FILTRATION COMPANY BOX A-153 **LEBANON, INDIANA**

panded use of already popular carbides for the machining of these metals.

Among the many fields where carbides are expected to be used more generally are the drilling of cast iron with carbide twist drills and in trepanning. Users of the new cast iron drilling process report doubled production with trebled tool life.

Saves a Slug—The new carbide trepanning techniques make it possible to drill an 18-foot long gun barrel in 36 minutes where it previously took 15 hours. A bonus advantage here is that frequently the center portion can be removed as a usable slug of metal instead of coming off as chips. Use of this machining method will spread.



Operator is beveling the cutting edge of a chrome-molybdenum bed knife for a gang mower. Minnesota Mining & Mfg. Co. says the manufacturer saves 15.3 cents per knife and wrote off entire machine cost in 60 days

One machine which is relatively new to American industry, had its foundation laid many years ago in Europe. It needed a real and specific application to make it practical in this country. That machine is the right-angle lathe, made by several different companies and called by several different names.

Turnabout—Essentially this machine differs from the standard lathe in that its principal ways are what most machinists would think of as the cross-slide. The large-diameter jet engine rings created the need for these machines. Contouring devices have been applied to them and they have established

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Only Ready-Power gives your electric trucks full efficiency for every minute of every hour . . . all day long. And because Ready-Power-equipped trucks are so easy to operate, drivers are more efficient, too. Unlimited power plus alert drivers add up to more ton-miles per hour.

Remember . . . Your Truck Is No Better Than Its Power

CONTINUOUS-DUTY POWER UNITS

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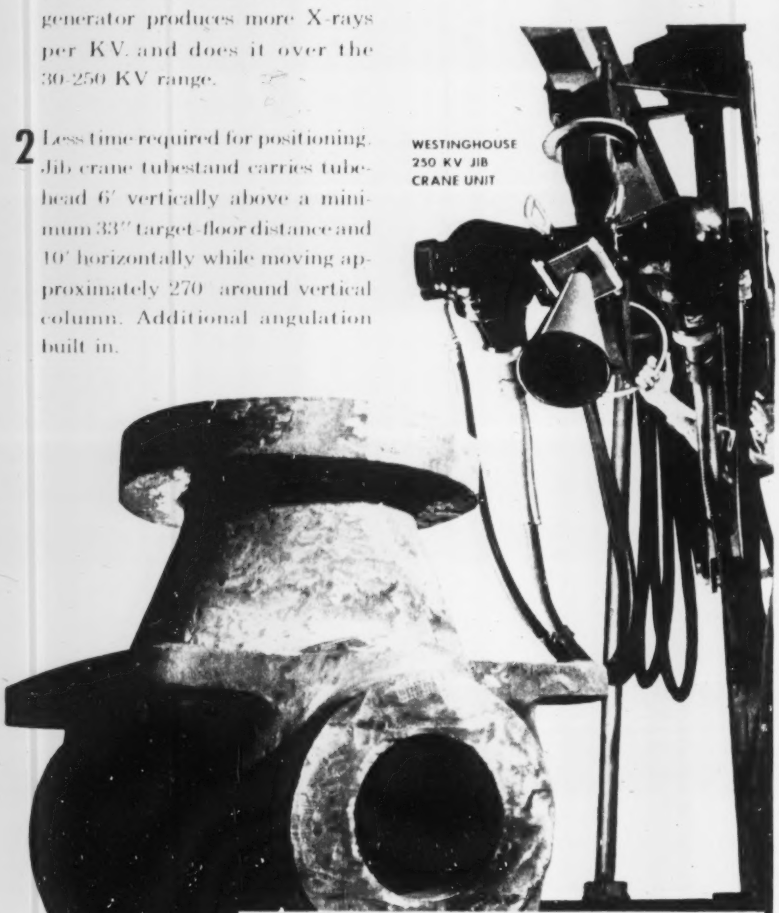
TOUGH JOBS made easy

At American Steel Foundries' plant in Newark, New Jersey, inspection of heavy steel castings is made easy by Westinghouse Industrial X-ray equipment. Reason: extreme *flexibility*.

1 Thick *or* thin materials take less time to radiograph. Westinghouse *Constant Potential* high voltage generator produces more X-rays per KV. and does it over the 30-250 KV range.

2 Less time required for positioning. Jib crane tubestand carries tubehead 6′ vertically above a minimum 33″ target-floor distance and 10′ horizontally while moving approximately 270° around vertical column. Additional angulation built in.

Westinghouse assures you the finest, most flexible X-ray tools for your inspection jobs *plus* a coast-to-coast staff of technical experts. Call your Westinghouse X-ray representative or write Westinghouse Electric Corporation, 2519 Wilkens Avenue, Baltimore 3, Maryland.



WESTINGHOUSE 250 KV JIB CRANE UNIT

YOU CAN BE SURE...IF IT'S

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J-08264

themselves as a standard machine for large-diameter, short work.

Broaching will probably take a big jump in 1953. Until recently broaching speeds have been limited to 24 to 65 fpm. Now with the advent of higher-speed hydraulic machines and the new electric broaches, higher speeds are obtainable.

Longer Life—Today it is possible to broach with speeds up to 150 fpm. At certain of these high speeds, while cutting steel, it's possible to obtain superb finish on broaches made out of high speed steel. Tool life of broaches at these speeds, in certain instances, outwears the life at slower speeds. There is no vibration or shock.

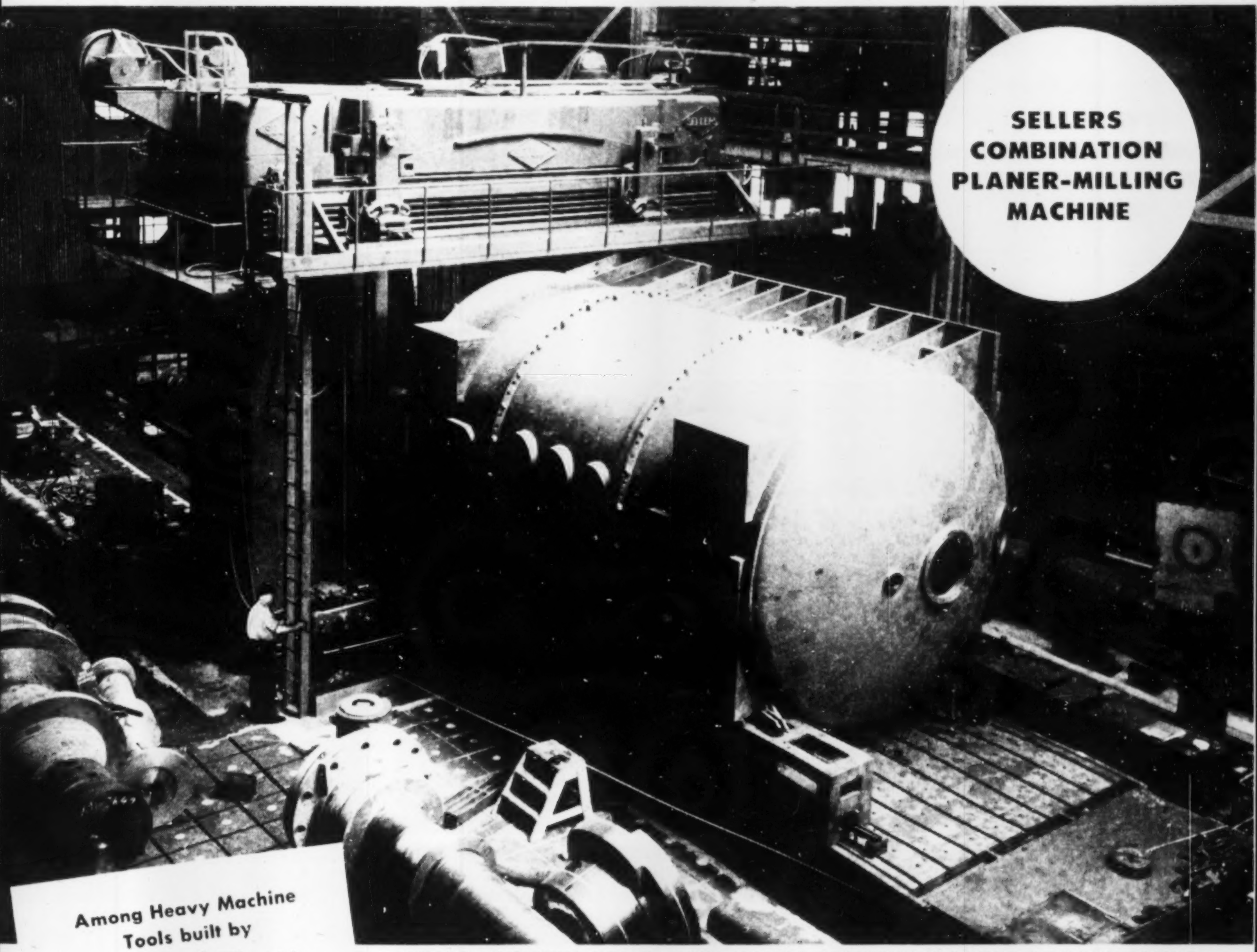
Splitting a milling cutter with a friction saw built by DoAll Co., Des Plaines, Ill. In this method the friction generated by the band actually softens the metal ahead of the cut and the teeth scoop material from slot

At the slower speeds, carbide broaches proved inefficient on broaching anything but cast iron. With speeds of 150 fpm and more, carbide will find its place in the broaching of steel.

Tough Babies — New materials, almost all of them tough to machine, have placed perplexing problems in the laps of metal-removal experts.

Machining of high strength materials is prominent among the problems which call for considerable attention. High-temperature, high-strength alloys used in jet engines probably have been the most troublesome. This is because industry has been called on to tool-up literally over night with very little prior knowledge as to how to machine these materials in large quantities. Cut and try has been the almost universal approach re-

ANOTHER GIANT CONSOLIDATED SPECIAL MACHINE FOR UNUSUALLY LARGE WORK



SELLERS COMBINATION PLANER-MILLING MACHINE PLANING A HUGH CASING

Among Heavy Machine Tools built by Consolidated are . . . .

LATHES
BORING MILLS
DRILL PRESSES
MILLING MACHINES
BORING MACHINES
COLD SAW MACHINES
BORING, DRILLING AND MILLING MACHINES
DRILL AND TOOL GRINDERS
PLANERS
SLOTTERS
RAILROAD SHOP TOOLS
AUTOMOTIVE TOOLS
AND OTHER SPECIAL MACHINES

The Sellers Combination Planer-Milling Machine is used in the production of equipment for industrial and power generating applications such as, synchronous condensors, hydraulic turbine-driven generators and large motors and generators for steel mills and similar installations. Two machines in one . . . a planer and a miller . . . it eliminates the necessity of transfering work from one machine to another when both planing and milling operations are required. This huge machine is over 76 feet long, 27 feet high and weighs more than 645,000 pounds. It has the capacity to machine work 14 feet wide, 16 feet high and 30 feet long. Due to the enormous capacity of the machine, several parts to be machined may be bolted together and handled as a single unit.

BUILDERS OF HEAVY DUTY MACHINE TOOLS SINCE 1848

BETTS • BETTS-BRIDGEFORD • COLBURN • HILLES & JONES • MODERN • NEWTON • SELLERS

CONSOLIDATED
MACHINE TOOL CORPORATION

SUBSIDIARY OF FARREL-BIRMINGHAM COMPANY, INCORPORATED
ROCHESTER, NEW YORK

Somewhere in the future...!

Perhaps one day soon, you'll want to . . . have to . . . produce THREADED PARTS *faster, more accurately!* The time is sure to come, for with today's speed-up of production, government requirements, high speed tools, faster equipment, newer, better metals, advanced engineering methods and high civilian demands, you'll be looking about for a machine that will produce your THREADED PARTS *faster, at lower costs!*

When that time comes . . . and it will . . .

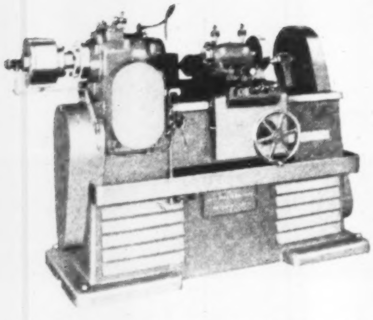
LOOK TO A COULTER

TODAY, COULTER OFFERS YOU 3 METHODS TO FASTER THREADING...AUTOMATICALLY

Either machine is right for you. Years ahead in design, construction, workability, output, versatility, accuracy . . . each tried, tested and proven!

So today... do it faster, better AUTOMATICALLY, with a COULTER!

Production Machines Since 1896



"H1" — for precision, internal, external, right and left hand threads . . . AUTOMATICALLY.

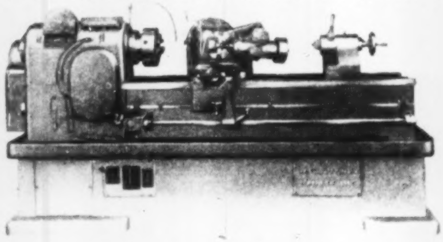
EXCLUSIVE ADVANTAGES:

- High speed drive to work spindle.
- New, wider range of speeds and feeds.
- High speeds for non-ferrous metals.
- Slow speeds for heat treated materials.
- Motors enclosed . . . easily accessible.
- Quick change over for short runs.

"L1" — for precision, square, standard and 29 degree threads. Internal or External . . . AUTOMATICALLY.

EXCLUSIVE ADVANTAGES:

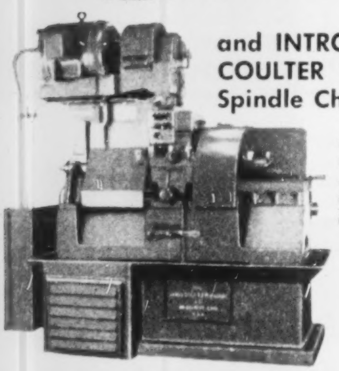
- Four speed headstock.
- Return or idle travel speed increased five times cutting speed.
- Disc clutch. Start and stop easily.
- Operator always has control.
- Individual adjustments to both front and rear tool slides.



"THREADMASTER" — for precision, long and short traversing, elevating, cross feed and lead screws . . . AUTOMATICALLY.

EXCLUSIVE ADVANTAGES:

- Cutter head design permits full size cutter spindle.
- Use a plain or anti-friction bearing spindle in same housing.
- Conventional or climb cutting possible.
- Wide range of speeds and feeds.
- Takes small or large diameter work.
- Full size spindle.
- Use high speed steel or carbide cutting tools . . . on any materials.



and INTRODUCING THE NEW COULTER "T5" . . . Single Spindle Chucking Machine.

Now, drill, ream and counter bore, face and form turn . . . automatically. Here are multiple operations in one chucking.

EXCLUSIVE ADVANTAGES:

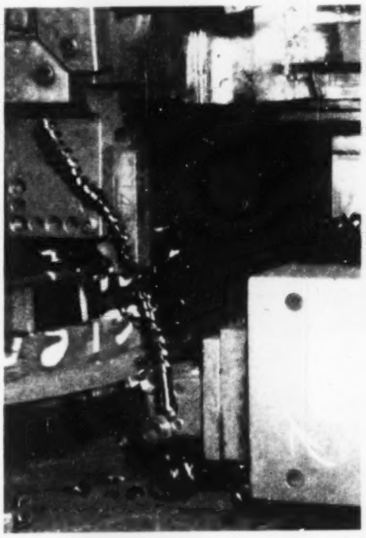
- 3 times faster.
- No second operation needed.
- Use any materials, with carbide tools.

Write for complete information. Tell us your problems, our engineers can help you.

The James Coulter Machine Co. BRIDGEPORT, CONN.

sulting in many failures and costly duplication. The situation is still critical.

New System—There has been a significant change in the character of the problems associated with tooling up to machine these materials. Previously the solutions of machining problems fit into a pattern wherein first solutions were the answers to the basic questions, "How do we machine the materials?" "How do we speed up to meet production schedules?" and "How do we reduce cost?"

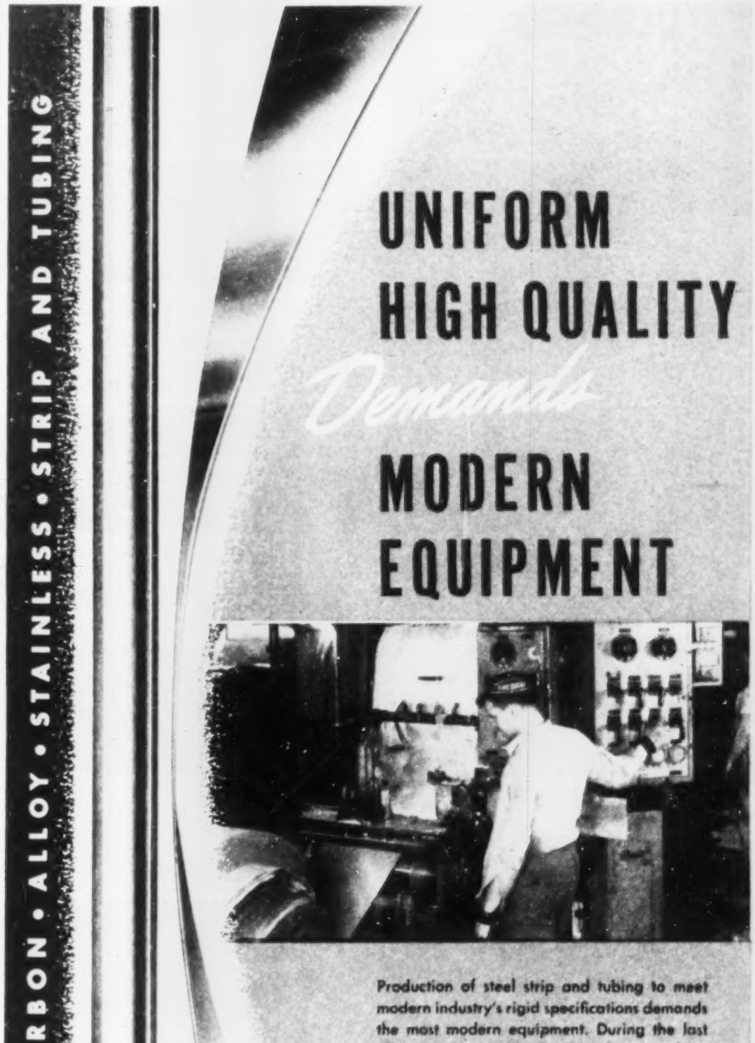


Here 40-inch locomotive wheels are machined with mechanically-held cylinders of Kennametals K4H carbide cutters. Cylinders can be indexed five times, 12 wheels per index, 60 wheels per end, 120 wheels to the grind

Problems on how to machine are now complicated by the possibility of damaging the ability of the material to meet performance specifications. It may be necessary to know the type and extent of residual stresses and strains imposed on the part by different machining operations before a satisfactory choice can be made.

Methods are being developed for laboratory study of these problems and it is possible that considerable research on the residual stresses arising from machining will be necessary before the performance specifications of high-strength products can be extended

The Lubricants—Cutting fluids



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UNIFORM HIGH QUALITY *Demands* MODERN EQUIPMENT

Production of steel strip and tubing to meet modern industry's rigid specifications demands the most modern equipment. During the last 30 years, The Wallingford Steel Co. has kept pace with developments in both machinery and techniques by sponsoring a continuous program of replacement and improvement. Today, not one piece of original equipment is still in use. The two-stand, four-high tandem rolling mill shown above is an outstanding example of the many precision built production machines in our completely equipped plant. Electrolimit continuous mill gages provide a constant check in holding strip to extremely close tolerance.

THE
WALLINGFORD
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STEEL
CO.
WALLINGFORD, CONNECTICUT, U.S.A.

LYCOMING USES 59 NORTON grinding machines on one big engine job

"Lycoming-Built Ordnance Continental Model 895 Engine." That is the official description of the product of the new Lycoming engine factory at Williamsport, Pa.

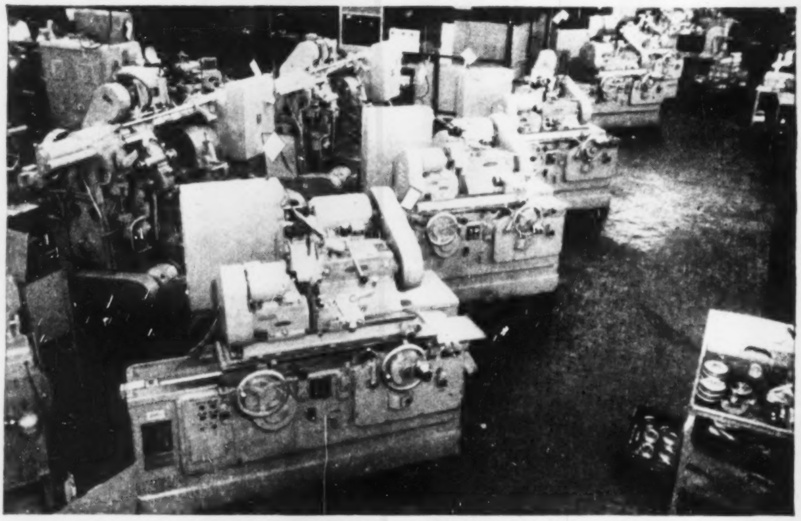
Model 895 is an army tank engine — 6 cylinder, horizontal opposed, air cooled, made in both supercharged and unsupercharged types. For the many grinding operations required to build it, Lycoming engineers selected 59 Norton grinding and lapping machines — an installation worth talking about, worth your serious consideration.

Some of Lycoming's Norton machines and the jobs they do are shown here. Perhaps you have jobs like these. Or perhaps your applications are entirely different. In either case, Norton will be glad to work with you on plans to fit standard or special grinding machines into your present or "post emergency" production.

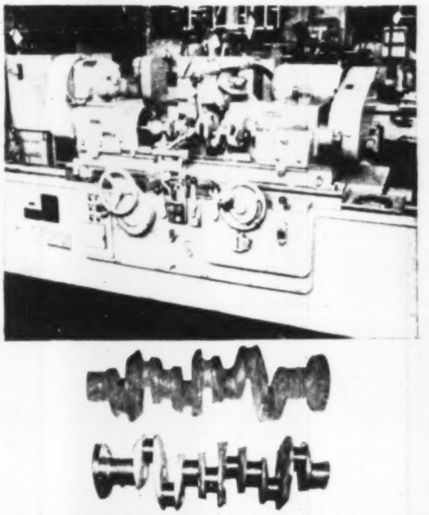
Remember — only Norton offers you such long experience in both grinding wheels and machines to help you produce more at lower cost.

For further information on the world's most complete line of grinders and lappers, see your Norton Representative or write us direct. **NORTON COMPANY**, Machine Division, Worcester 6, Mass.

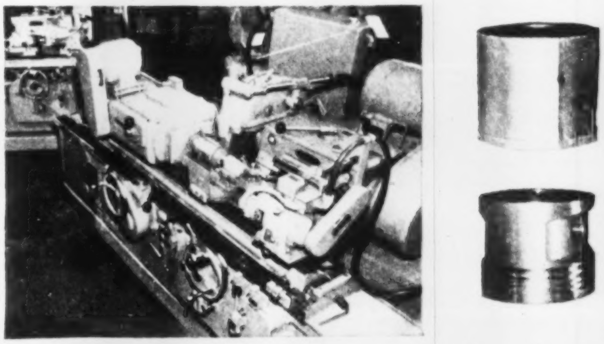
ASSEMBLY LINE FOR MODEL 895 ENGINES. In Lycoming's plant at Williamsport, Pa. Norton Grinding Machines are used in the grinding of components for this engine.



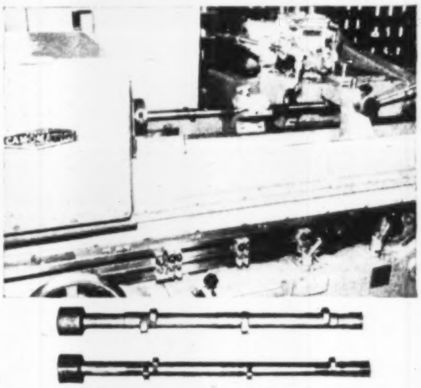
BATTERY OF 17 NORTON MACHINES. This picture shows an installation of seventeen 6" x 18" CTU Semiautomatics used for miscellaneous grinding of 80 different kinds of parts.



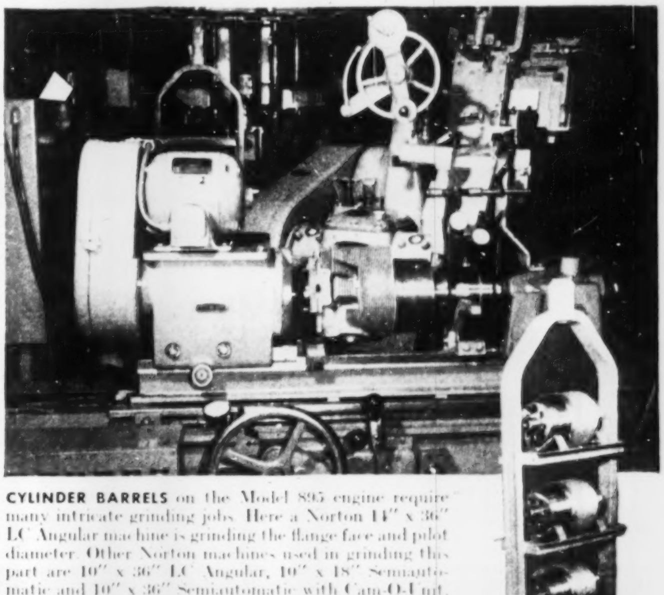
MAIN CRANKSHAFT BEARINGS are finish ground on Norton 14" x 36" LCTU Semiautomatic grinding machines. An interesting detail is that crankshafts are not centered to depth; therefore a base mounted locator is used on each machine. Crankshafts shown as forged and finish ground.



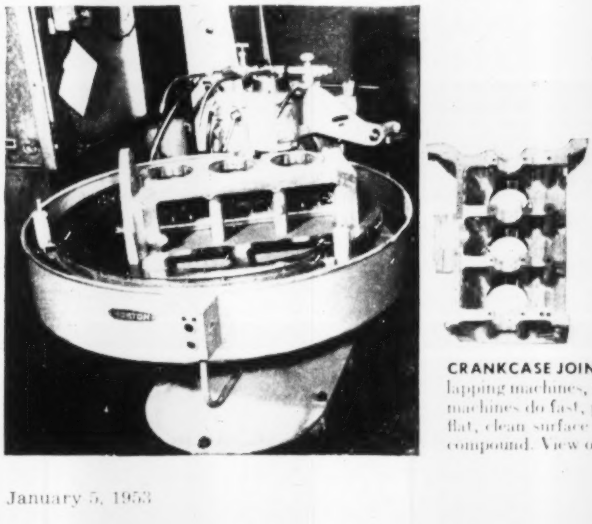
CAST ALUMINUM PISTONS are used in the unsupercharged engine, forged aluminum pistons in the supercharged. All are ground on Norton 10" x 36" CTU Semiautomatic grinding machines, equipped with the compound Cam-O-Unit and the self-contained motor driven truing device which trues the wheel. At right: A Model 895 piston forging and the finished product.



CAMSHAFTS are ground all over, with 3 grinds on the cam contours, all with small diameter wheels because of re-entrant curve. Norton 6" x 30" CTU Semiautomatic and No. 2 Cam-O-Matic machines are used. One of the latter is shown grinding the contours. Model 895 camshafts illustrated, before and after finish grinding.



CYLINDER BARRELS on the Model 895 engine require many intricate grinding jobs. Here a Norton 14" x 36" LC Angular machine is grinding the flange face and pilot diameter. Other Norton machines used in grinding this part are 10" x 36" LC Angular, 10" x 18" Semiautomatic and 10" x 36" Semiautomatic with Cam-O-Unit. Insert: Barrels in holding frame, ready for grinding.



CRANKCASE JOINT FACES are lapped on Norton No. 2F lapping machines, using 36" bonded abrasive laps. These machines do fast, precise work on soft metals, leaving a flat, clean surface which is free from imbedded lapping compound. View of crankcase shows the lapped surface.

To Economize, Modernize With NEW

NORTON

GRINDERS and LAPPERS

Making better products to make other products better

District Sales Offices: New York • Cleveland • Chicago • Detroit

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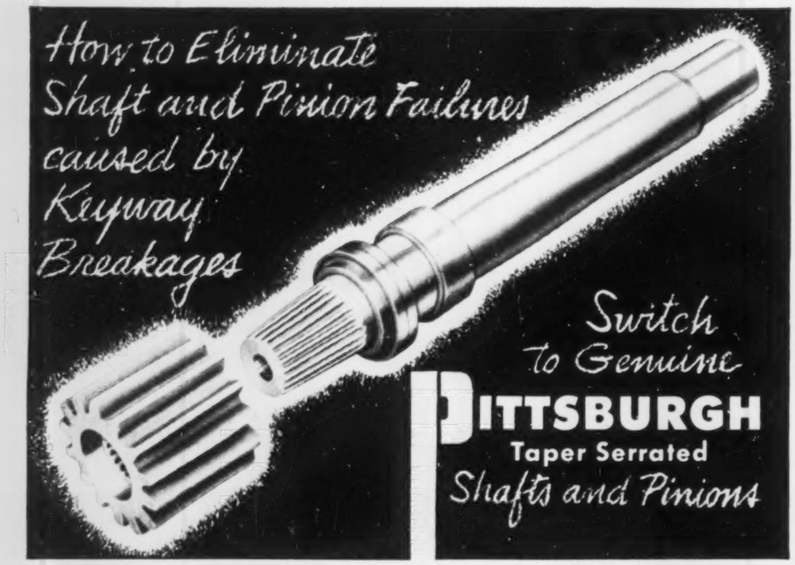
How to Eliminate Shaft and Pinion Failures caused by Keyway Breakages
Switch To Genuine
PITTSBURGH
Taper Serrated
Shafts and Pinions

33⅓% Increase in Life of Shafts and Pinions

Keyways weaken both shaft and pinion and frequently cause failures and work stoppages. But this can be eliminated by using PITTSBURGH Taper Serrated Shafts and Pinions which provide an all-around **V-lock** for great strength and endurance.

The male serrations on the shaft lock perfectly in the female serrations of the pinion. There is just enough taper so the pinion can be easily "shocked" on or off the shaft. One user reports no failure on more than 75 PITTSBURGH Taper Serrated Shafts and Pinions installed during a 4½ year period.

Genuine PITTSBURGH Taper Serrated Shafts and Pinions are available in many standard sizes, or made to your requirements.

Send your specifications today for prompt quotation.

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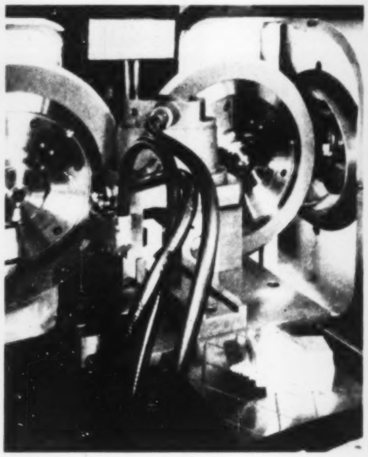
received renewed attention in the field of machining in general—particularly with respect to improving their ability to penetrate the chip-tool interface by improved methods of application.

A variety of such methods attracted interest, including the use of high pressure jets directed into the clearance space between tool and workpiece, the use of feeder grooves in the flank of the cutting tool combined with flooding of the tool from below, and even the use of mist application of the fluid.

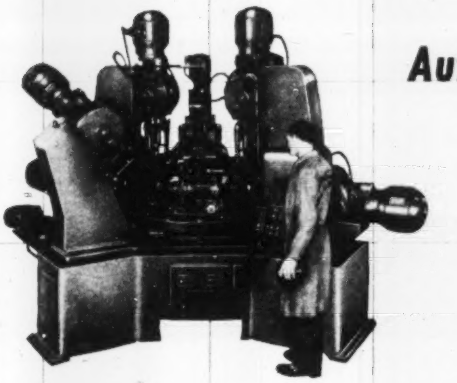


Familiar Christmas-tree root to the jet engine blade is ground from start to finish in one setup. The J.&L. grinder uses two wheels contour dressed periodically by diamond tips

The Snow Storm — Related to this was the sudden interest in the use of liquid carbon dioxide as a cooling medium for machining and grinding. In this, a jet of liquid carbon dioxide is directed on the tool or work in the vicinity of the zone where chip formation is taking place.

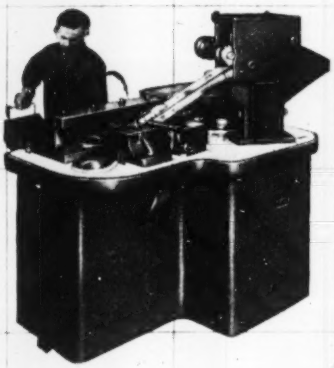
As the high-pressure flashes into CO$_2$ "snow" considerable cooling takes place. Best success seems to have been obtained in the application of this to the rapid grinding of sintered carbide cutting tools with silicon carbide wheels, thus also helping to conserve diamonds.

Now Under Wraps—More new model machines will be unveiled in the next year or so than in any comparable period since the war.



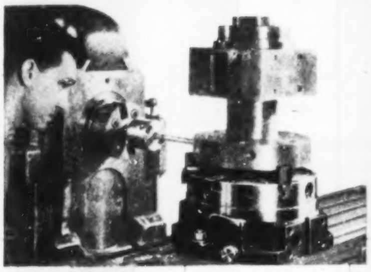
Automatic Drilling & Tapping Machines

Hartford Special single purpose drilling and tapping machines are built to provide the maximum in production efficiency with economy. Our customers include the leaders in every phase of American industry. Bulletin DM-100 furnishes specific examples.



Automatic Thread Rollers

For rolling machine screws, wood screws, drive screws, specials etc. Hartford Special makes two models to handle any requirements from 1/8″ through 2½″ thread length and .086 through .3125 in diameter. These machines have automatic feed, self-lubrication, rugged construction, plus other features which result in accurate high production. Ask for Bulletin.



Super-Spacers

Hartford Special's world famous indexing fixture, the Super-Spacer, is available in two models with 8″ or 12″ capacity. The Super-Spacer speeds production and permits rigid control of accurate machining operations such as grinding, planing, slotting, drilling, milling, boring etc. New Bulletin gives complete details.

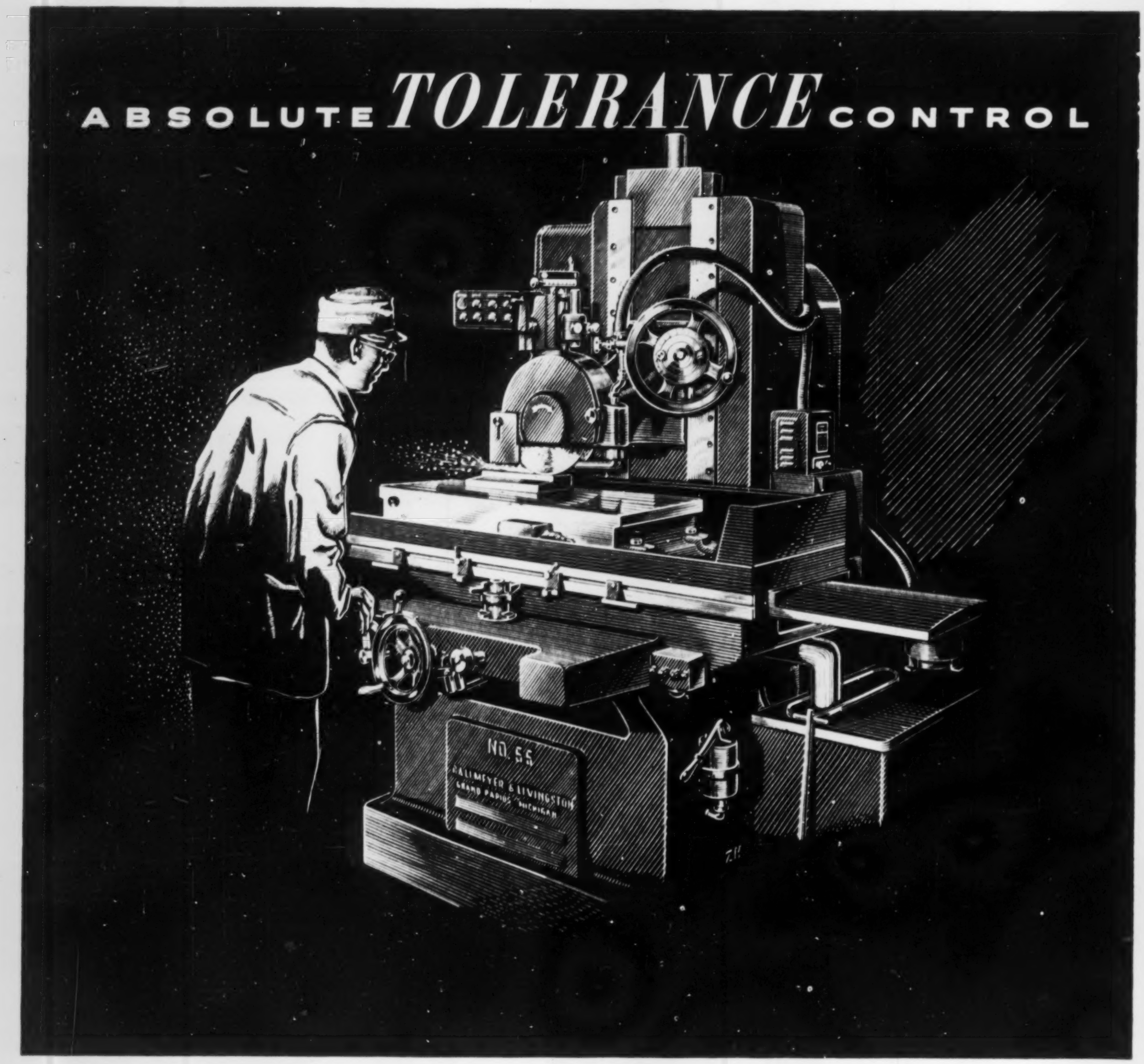
To up your production curve . . .

come to

HARTFORD

Special

THE HARTFORD SPECIAL MACHINERY CO. HARTFORD 12, CONN.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When job specifications leave no leeway, when extreme tolerances must be maintained . . . that's when the built-in precision and absolute tolerance control of Grand Rapids Grinders proves most valuable. Defense commitments make it impossible for us to fill your orders as rapidly as we'd like to . . . but we know our customers can appreciate the reasons for delay. As always, we're doing our best to serve you.

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GALLMEYER & LIVINGSTON

GRAND RAPIDS GRINDERS

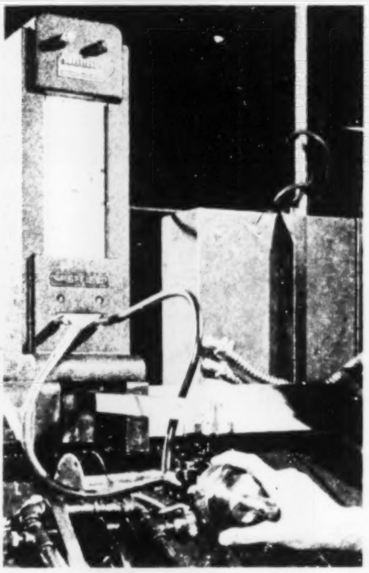
. . . the very best

Manufacturers of
SURFACE GRINDERS • CUTTER and TOOL GRINDERS • TAP and DRILL GRINDERS

That's the thinking of most machine tool makers. Here are the two primary reasons.

Although most backlogs are holding up, sometime in the latter part of next year the buyer's market is expected to return. That means highly competitive sales which always has as its running mate new models.

Foreign Competition—The second stimulant is the rapidly progressing European machine tool output. The machine tool industry in Europe has made amazing recovery since the time just a few years ago when it was flat on its back. The machines coming out of Europe are suprisingly good and constitute a real threat to the American tools.



Automatic gaging methods such as this installation at Ford Motor Co., Detroit, are continually finding new applications in accelerated production

All of the American machine tool makers recognize this and know that the answer to the threat from overseas lies in improved domestic models. They're convinced that to maintain the superiority they feel exists, American machine tools will have to be researched, improved, modified and bettered. None of them underrate the Europeans.

What to Look for—Now as to what these new machines will be: Higher horsepower driving units and more beef per machine will

✓ check the price

✓ check the analysis

✓ check the performance

and you'll specify

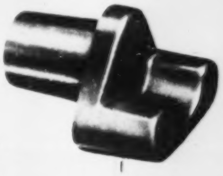
MUELLER BRASS CO.

tuf-stuf®

aluminum bronze

check the price—Tuf-Stuf, the Mueller Brass Co. series of aluminum bronze alloys, can be supplied at prices below those of similar alloys. Whether you buy Tuf-Stuf in rod shapes, forgings or screw machine products you'll save money because these alloys are priced right, machine better and last longer.

check the analysis—Tuf-Stuf alloys are a high copper base series containing from 9% to 13% aluminum and varying amounts of iron, nickel and manganese. They do not contain zinc and, therefore, are not subject to dezincification. Tuf-Stuf alloys are available in several grades with a chemical composition, suitable hardness and mechanical properties for many different applications



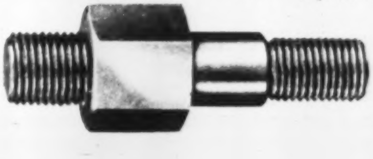
check the performance—Tuf-Stuf alloys are light and strong—about 8% lighter than cast bronze and almost as strong as steel. They have a low coefficient of friction as well as good bearing and mechanical properties. They not only retain these properties but resist oxidation at the high speeds and high temperatures of modern production equipment. They will withstand strong acid attack or the effects of brackish waters and are highly resistant to corrosion.

These alloys can be hot-forged into relatively intricate shapes . . . need little or no machining . . . and the smooth, bright surfaces eliminate costly finishing.

MUELLER BRASS CO.

PORT HURON 19, MICHIGAN

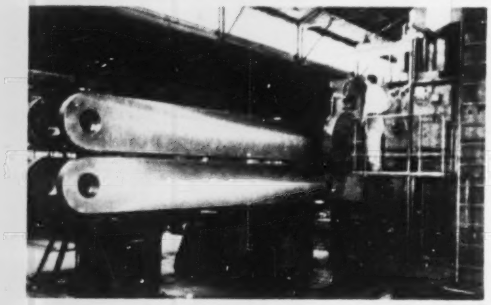
For complete information, write today for our new TUF STUF Engineering Manual.



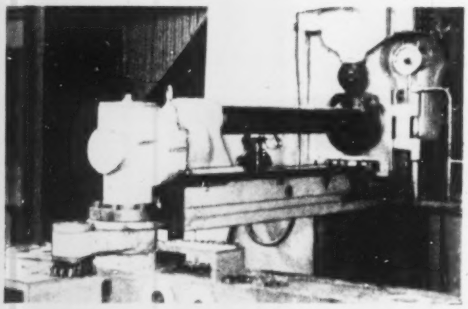
tuf-stuf
alloys

How the new G&L underarm simplifies machining huge

G&L 50-series horizontal boring, drilling, and milling machines now available with 60″ underarm to reduce handling time . . . speed work



A continuous feed facing head, mounted on the underarm, machines two arms of an aircraft stretch forming press. Longitudinal travel of G&L machine's runway provides ample cross feed for long parts.



90° Offset Milling Attachment performs similarly to Angular Milling Attachment, but is used on recess surfaces that the latter cannot clear. Swivels full 360°.

NOW, with this new G&L development, it's possible to perform a vast range of operations on awkward, complex or bulky castings or forgings in a single setup. It not only speeds your work and reduces handling time — it improves overall accuracy.

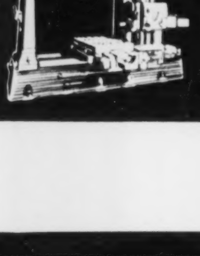
Built into the machine headstock, the underarm support allows very accurate machining operations to be performed at right angles or parallel to the spindle without repositioning the workpiece. The underarm provides rigid support for heavy-duty milling, facing, boring and shaping tools at distances from the face of the headstock which heretofore had been impossible.

Six types of tools can be mounted on the underarm: 46″ face plate drive, 48″ continuous feed facing head, 90° angular milling attachment, 90° offset milling attachment, spindle support, and shaping attachment.

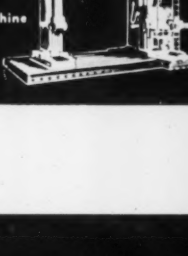
To get the details on this new work-speeding, time- and labor-saving development . . . for a rundown on G&L's complete line of heavy machine tools . . . or for information on the G&L Job Analysis Service — contact your nearest G&L representative. Don't delay — delivery on G&L machines may be better than you think.

GIDDINGS & LEWIS

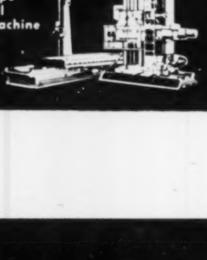
Table Type Horizontal Boring Machine



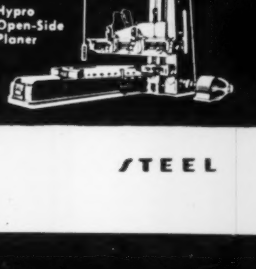
Floor Type Horizontal Boring Machine



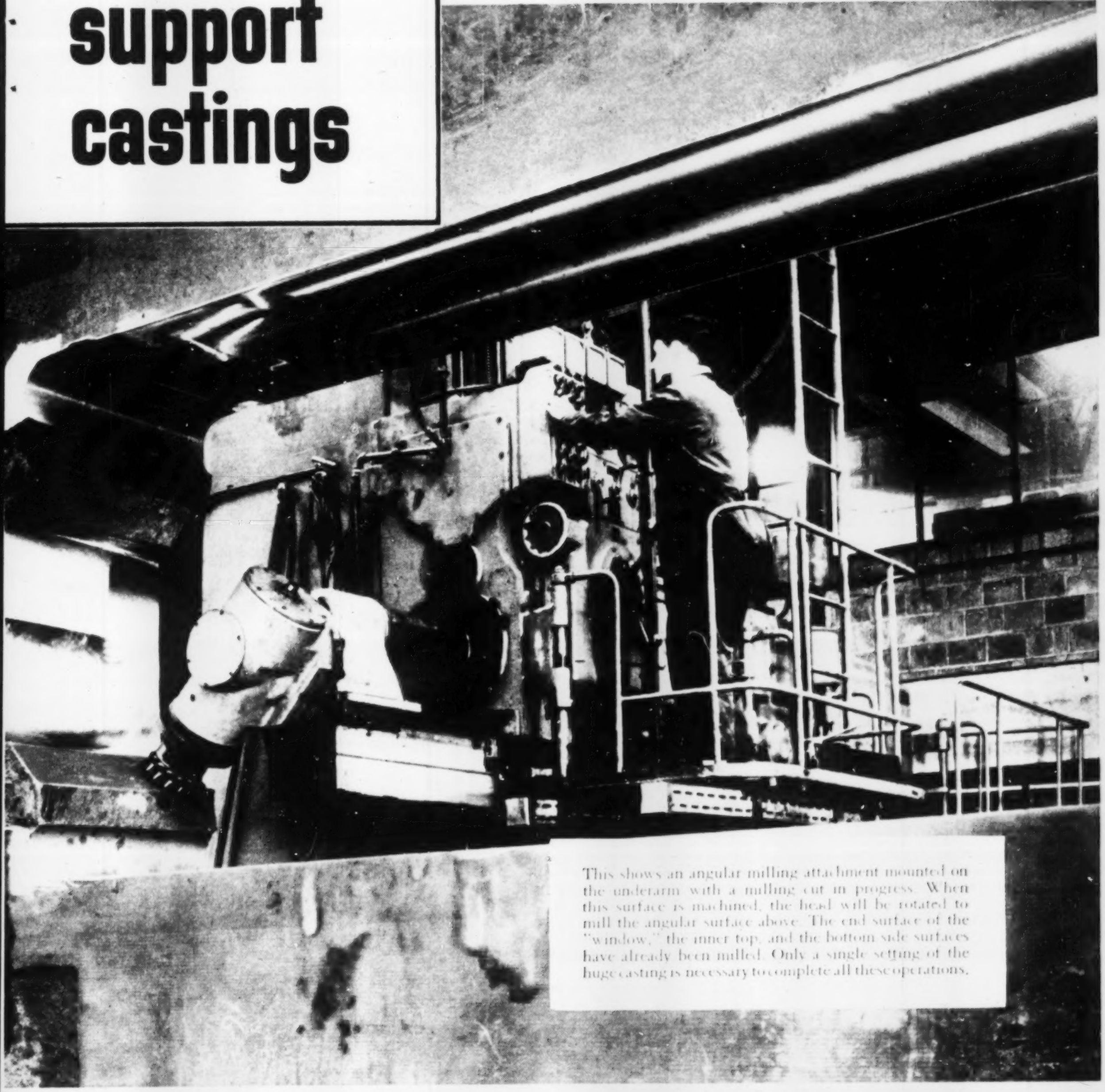
Planer Type Horizontal Boring Machine



Hypro Open-Side Planer



support castings

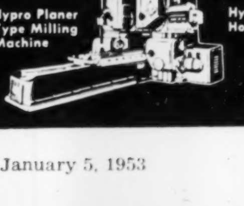


This shows an angular milling attachment mounted on the underarm with a milling cut in progress. When this surface is machined, the head will be rotated to mill the angular surface above. The end surface of the "window," the inner top, and the bottom side surfaces have already been milled. Only a single setting of the huge casting is necessary to complete all these operations.

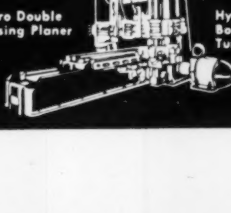
G-21

MACHINE TOOL CO.

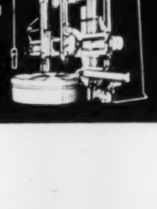
Hypro Planer Type Milling Machine



Hypro Double Housing Planer



Hypro Vertical Boring and Turning Mill



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help in the drive for faster and heavier cutting.

More uniform wiring and control panels are in sight. This will be particularly well received by the maintenance man who has to work around wires carrying enough juice to deal a real blow.

More use of hydraulic clutches in the heads of large machines (saddle-type turret lathes in particular) will speed the cycle when heavy chuck loads are being handled.

Better Looks—Attachments and accessories which upgrade the machine's productivity in various types of work will receive more emphasis. It's these attachments which turn an otherwise standard machine into one capable of producing special parts at increased rates.

Finishes on machine tools are likely to improve further. Likewise corners may be rounded off and the machines streamlined. Pieces machined is still the big sales point of the machine tool salesman, but eye appeal of the machines will not be overlooked.

Optics—Expect the application of optical instruments on machines to increase. These make for exceptionally accurate settings without the need for special gages, scales and other off-the-machine measuring devices. Optics is already in use on models of both European and American machines.

Likewise the application of electronic control systems is on the upswing. Here a warning should be sounded. Complication of electronic equipment should be directly related to the ability of the in-the-plant maintenance crew.

Many plants find that long-down time results when proper maintenance ability is missing. Problem is the training of qualified men to do the job.

Often the right men are already in the plant doing other work. They may have had electronic training in the military service and need little brushing-up to do a good job in electronic repair.

Searches of the employment records and some personal interviews can make a big payoff in electronic maintenance.

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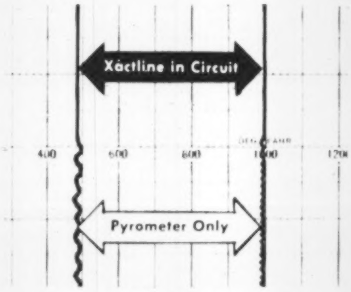

Exact reproduction of temperature chart for a heating process showing the comparison of the "Straight Line" temperature control produced by XACTLINE and the saw tooth curve obtained with only conventional control.

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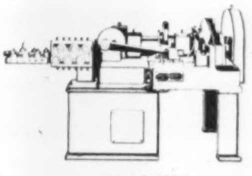
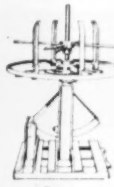
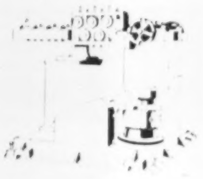


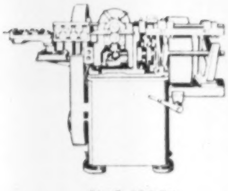
SLIDE FEED
STRAIGHTENERS



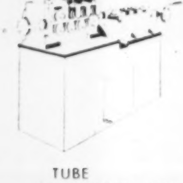
REELS



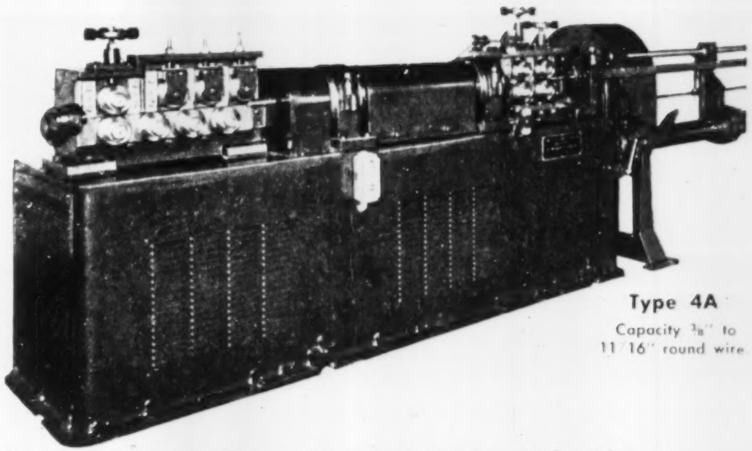
FEED
STARTERS



FLAT STOCK
STRAIGHTENERS



TUBE
STRAIGHTENERS



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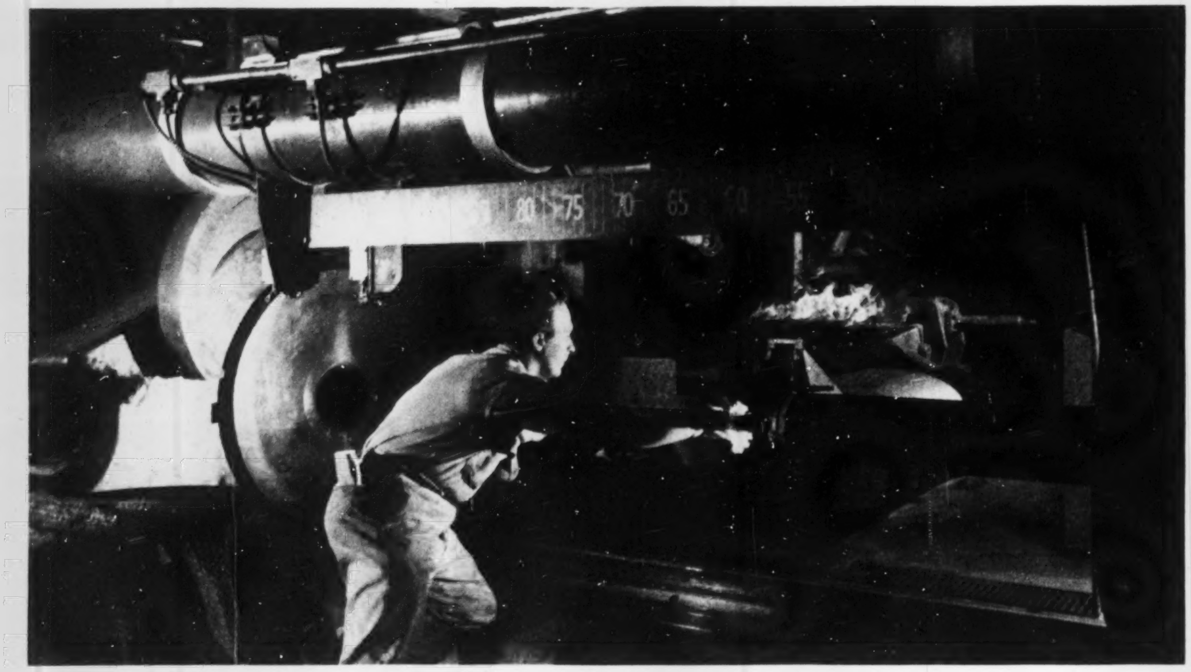


Ugine-Sejournet extrusion method in use at Babcock & Wilcox Co.'s Beaver Falls, Pa., plant utilizes fiberglass as a lubricant. Here sock is placed over mandrel

FORUM ON TECHNICAL PROGRESS

Forming

New metals and methods place metal-forming directly in the spotlight. Its first act performance deserves applause. Continually rising demands make future of forming methods even more challenging

METAL FORMING men have surprised all bystanders. The industry which could not possibly achieve any great deal of automation has crossed them up and done just that.

Until recently most people thought that it was well nigh impossible to get rid of hand feeding and many of the other manual operations connected with forming metal, whether it be by forging, extrusion or any other of the methods.

Gets Up Steam—Several installations are almost totally automatic especially with respect to the transfer of parts from machine to machine.

The biggest single influence toward this automation is the immediate demand for defense production coupled with the almost ridiculous situation of "business as usual."

Down the Line—Better integration of the forge shop with other processing departments is one example of more efficient operation. In at least one installation output was tripled by mechanizing the handling of stock from the billet to the finished part. Shearing, heating, de-scaling, rolling, forging, cooling, hardening, tempering, cleaning and inspecting operations all form one complete, unbroken chain of product processing.

Integration of this type means maximum efficiency (and output) with the facilities at hand. It will become more common as the forming methods grow.

Hottest Item—By far the biggest single piece of news in the industry is the announcement by the Air Force, of a heavy press program involving 17 giant forging and extrusion presses. All but one of the presses will be used on aluminum. The other is for steel.

None of these presses is completed. The building and excavation to house some of them has started and some of them are actually being built. Largest forging presses in the original program are two 50,000-ton models. A 25,000-ton extruding press is the largest in that category.

What It Means—Immediate impact on most of the metal forming business will be slight. Size of the presses is so great as to commercially interest only a few. But as a result of the program and what is learned in it, some entirely new ideas, and certainly some revision of thinking, will affect the whole industry.

During 1952 several trends in the design of standard machines indicate increasing awareness of customer problems beyond production requirements.

Better Controls — Automatic pressurized lubrication and complete enclosing of all operating mechanism of mechanical presses will be big aids to maintenance. Along with these there is improved and safer controls for the electrical systems as well as better clutches and brakes.

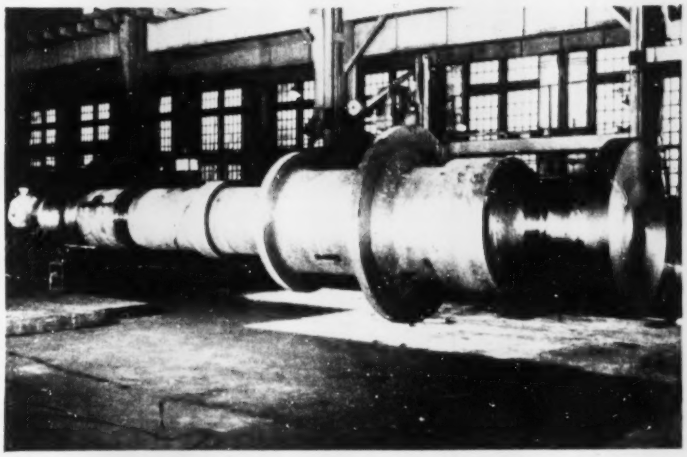
Progress has been made in obtaining large billets with sounder centers, more homogeneous structure and better surface condition. Techniques for handling, forging, and processing large impression die forgings are greatly improved and facilities for economical production are becoming available.

Cost Switch—Costs for the necessary die equipment and other preparation charges are offset by reduced costs in minimizing or eliminating operations such as machining for assembling several components, welding, straightening and salvaging.

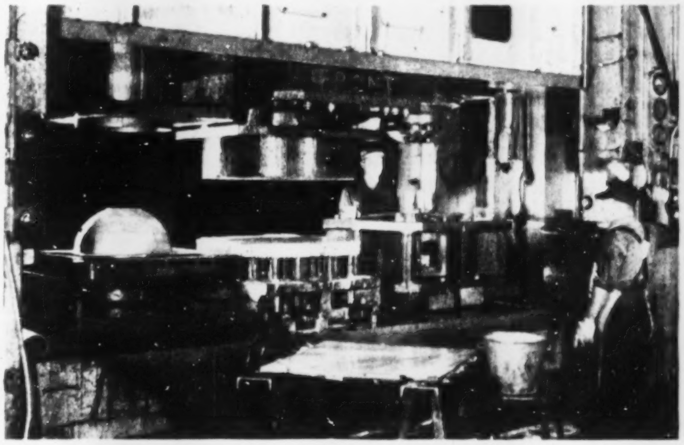
Available large hammer equipment permits the forging in impression dies many alloys and compositions in large sizes which were not considered possible a year or two ago. Another benefit of the large die forging is the high strength and reliability under dynamic stresses.

Heating — Faster and cleaner methods of billet heating also contribute markedly toward better and cheaper forgings. Use of the liquid salt bath as a means of billet heating has so far been principally confined to specialized metal forming operations, such as extruding, though there is little doubt that this method will eventually be used for more forging applications.

Use of controlled atmospheres for heating forging bars and billets improves die life by reducing scale and results in a more satis-



Size of forgings continues to grow. This one at Midvale Co., Philadelphia is an example. It's for a rotor. This growth of large forgings has been catapulted even further by the heavy press program



Double-acting hydraulic press is used to draw hemispheres at Leake Stamping Co., Monroe, Mich. Die at left restrikes flange radius. Center die draws and right die pierces the holes and trims flange

This 1000-ton press at Chrysler Corp.'s Nine Mile plant in Detroit is stamping out side cowl panels of 0.040-inch steel on plastic dies. Low cost of dies and simplified repair are two advantages factory production. This activity will see further emphasis in 1953.

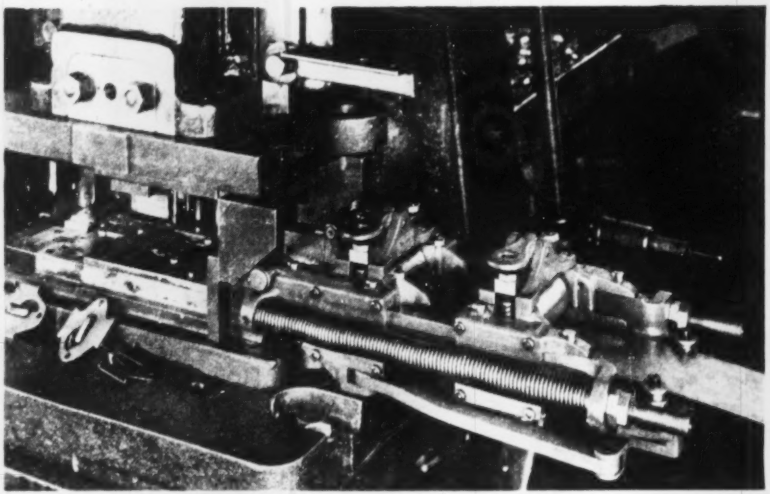
Plastics—Although use of plastic dies is no news to the aircraft industry, it is being put to use in the auto industry and all signs so far are cause for optimism. Savings in time and money spent making dies, lighter weight units and lower costs make this an attractive prospect for still more applications.

Material used in the dies is a thermosetting liquid phenolic casting resin. Among its properties is dimensional stability so that exact size patterns, instead of oversize to allow for shrinkage, are used. Extra advantage is that the dies are easily repaired.

Holds the Lubricant—Phosphate coatings are giving new life to cold drawing operations. The chemically bonded lubrication film demonstrates such economies as elimination of intermediate press operations, as well as annealing and chemical treatments; increased production with existing equipment; reduction in scrap losses, and extension of die life.

The coating functions as a carrier for an organic lubricant which is designed to react with the phosphate, in addition to being physically adsorbed.

Die and Hydraulics—Continued development on the use of a flexible member as one of the "dies" promises wider use in the future.



Automatic feeding devices give a boost to the production figures on stamping operations. Hazards of loading are removed—ceiling is top machine speed

One system, developed for deep drawing, works with the male die moving into a flexible "diaphragm." The blank, between the male die and the diaphragm, is formed to the contour of the die by the hydraulic pressure back of the diaphragm. This pressure increases as the die moves up and is uniform in all directions.

Another system consists of a male die and an inflatable rubber pad. This system is used for forming. In this case one or more blanks are placed on male dies. The table moves into the press and the bag is inflated. Pressures up to as much as 5000 psi can be developed and again they are uniform in all directions. This system will even return the flange.

Good Points — Several advantages are inherent in both systems. Absence of mating dies substantially lowers die cost. Uniform pressures mean fewer wrinkles and less subsequent hand forming.

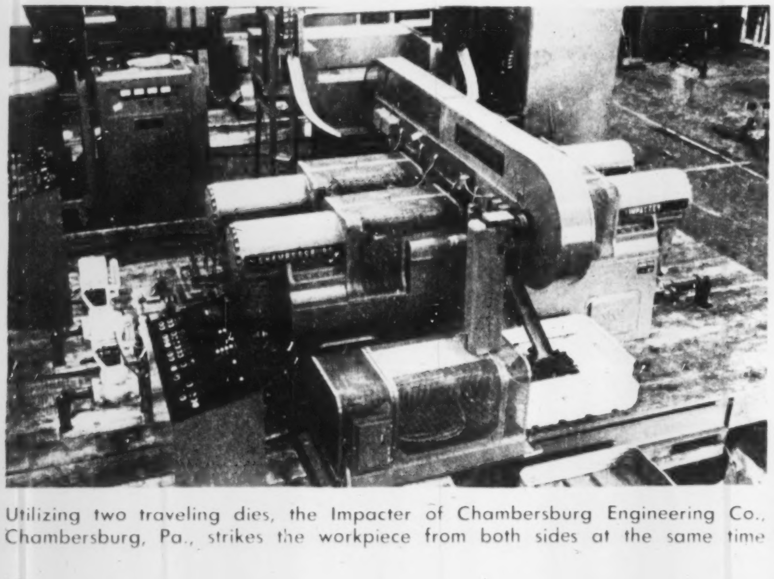
Press brakes prove themselves to be more versatile at every turn and will find increasing numbers of applications in the future. They're now used for braking, forming and stamping.

Wait in Line—Ordnance requirements presently demand the bulk of this nation's production capacity for cold extruded steel forgings. While civilian applications wait their turn, however, this relatively new process is being refined and developed.

Cold extrusion converts low-carbon granular steel slugs into parts with greatly improved metallurgical characteristics.

Saves Weight—The finer, fibrous molecular structure resembling the characteristics of a forging give the part greater strength than an ordinary casting of comparable size and weight. Consequently, cold-extruded steel parts can be lighter than their cast counterparts. Fifty per cent weight reductions in parts are not unusual.

Another important advantage is freedom from many costly finishing operations often associated



Utilizing two traveling dies, the Impacter of Chambersburg Engineering Co., Chambersburg, Pa., strikes the workpiece from both sides at the same time

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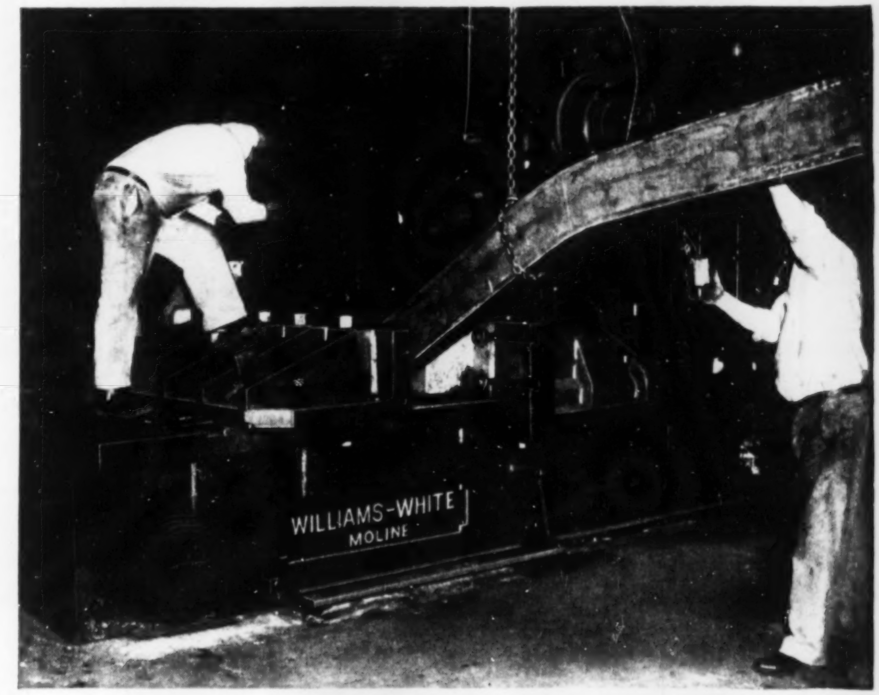

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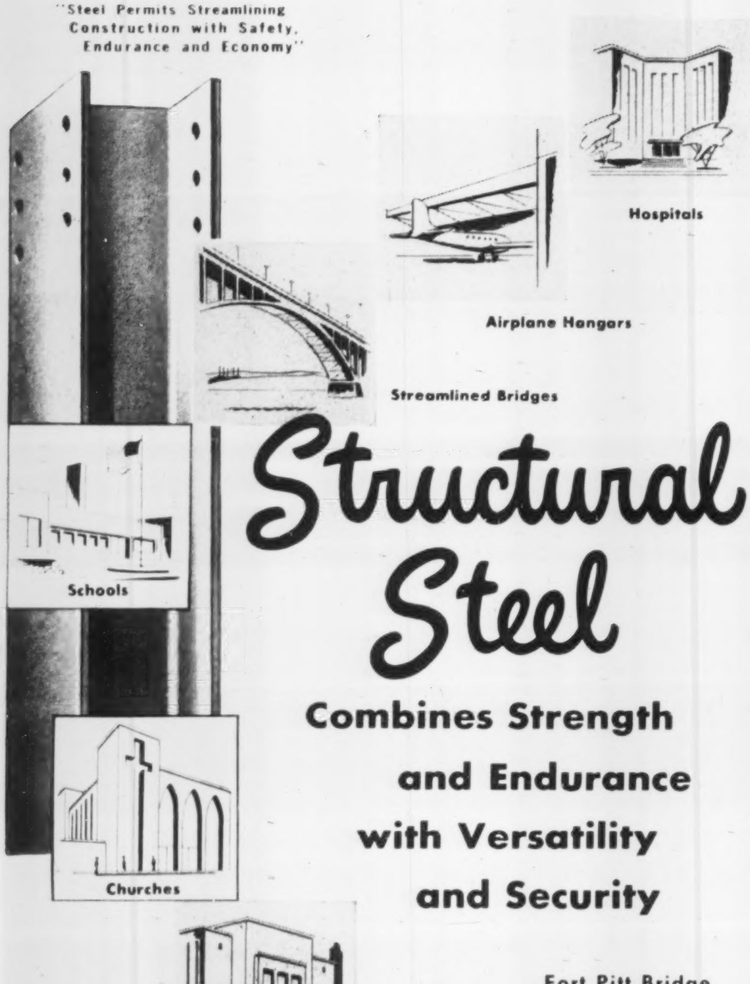

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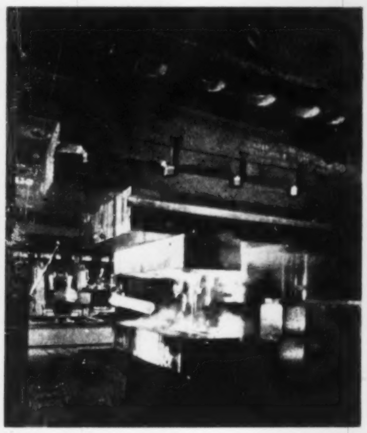
with castings. Parts are smooth when they come from the presses; machining operations are held to a minimum by tolerances obtainable in extrusion.

Many extruded parts require only a stress-relieving, normalizing trip through an annealing oven to be ready for use.

Spotlight—Hottest news in hot extruding is the application in this country of the Ugine-Sejournet process using glass as a lubricant. Glass, melting on contact with the hot steel, prevents seizing of the billet and tools plus insulating tools from heat.



These gaping jaws belong to the big 15,000-ton, German-built forging press at Alcoa's Cleveland plant. It will be dwarfed by new presses

Excellent lubricating properties of the glass reduce friction and make possible increase in billet length. The transfer car has an inclined surface on which a fiberglass mat is placed. As the car travels toward the extrusion press, the billet is raised out of a trough and rolls down the inclined plane fusing to the mat and picking it up. It then rolls into a trough at the front end.

No Metal-to-Metal—Previous to this a fiberglass sock is slipped over the mandrel and a glass cartridge placed against the die. With the mandrel lubricated by the sock, the die lubricated by the cartridge and container lubricated by the glass picked up by the billet in passing across the transfer car, metal to metal seizure is prevented on all surfaces.

Ordinarily the subject of cold

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BILLETS AND FORGINGS FOR PRODUCTION, TOOL ROOM AND MAINTENANCE REQUIREMENTS

heading suggests screw products and fasteners. Now, however, many of the parts produced by this process have little or nothing to do with screw fastenings.

For High Production — Instead they are complicated, highly specialized parts that go into thousands of mechanical applications. Where production quotas warrant the use of this method it can offer several advantages over other systems, one being improved grain structure.

Introduction of new metals to be fabricated has shoved a whole new class of problems into the laps of all metalworking. This is no less true in metal forming than it is in the rest of the fields.

Return of the flange is one of the advantages of the Verson-Wheelon, hydraulic press. Another is reduction of second operation work

Some Answers—Titanium is just one of the group but it holds the spotlight. Several companies are studying the problems of drawing and forming the metal. Results show that it can be done. Titanium takes more pressure than stainless steel. It shows a tendency to wrinkle around the top of drawn cups.

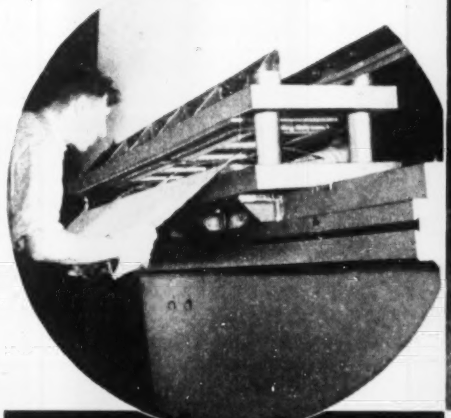
As a result blank holder pressures have been increased, which means heavier equipment. Titanium will not be hurried. Press speeds must be reduced.

Won't Crack—Forging of titanium also is getting a great deal of attention from some companies. Many of the problems are solved but others still remain. The scale formed when the metal is heated to forging temperatures has abrasive qualities and is hard on machine tools. This scale may well reduce the life of die sets in production forging below the number of forgings expected of the same dies in forging steel.

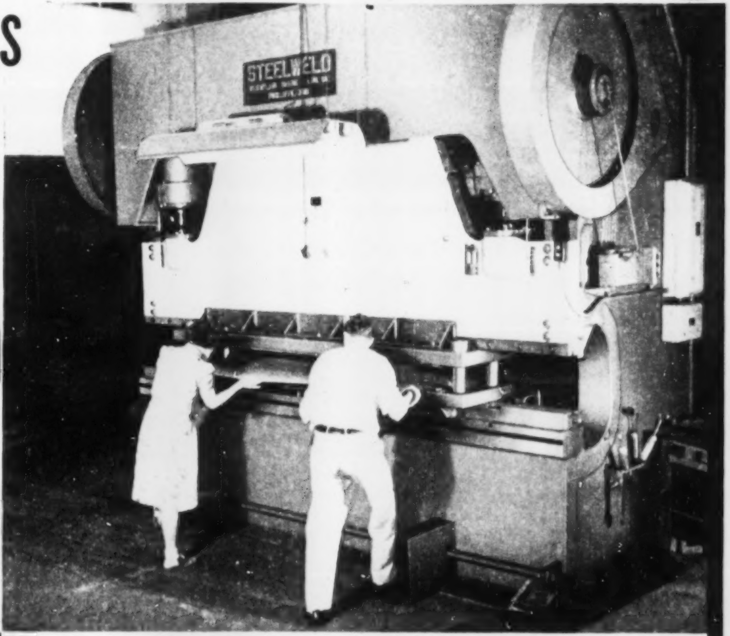
A bright spot in forging titani-

blanking and embossing

ACOUSTIMETAL PANELS



4800 panels for 12" x 24" sound-deadening cells are blanked out and embossed per 8-hour day with these dies.



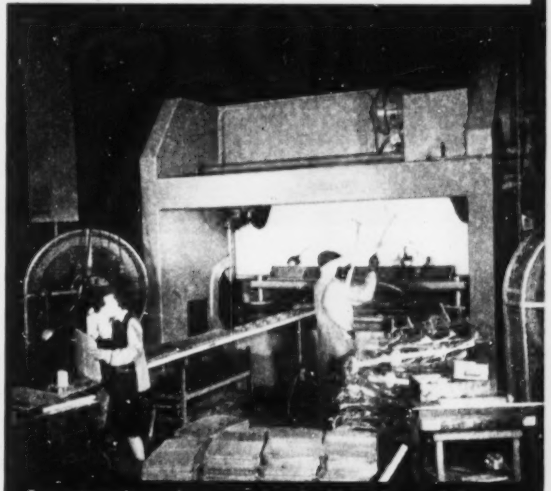
This rugged smooth-working press performs nearly every kind of metal forming operation at Dussing & Hunt, Inc.—bending, forming, flanging, blanking, embossing, and punching. It is easy to change the dies from one job to another or repeat previous runs of work to close tolerances.

Of the many types of work performed on the Model J4½-10 Steelweld Press at Dussing & Hunt, Inc., Buffalo, N. Y., the blanking and embossing of panels for Acoustimetal sound-deadening cells is one of the most interesting.

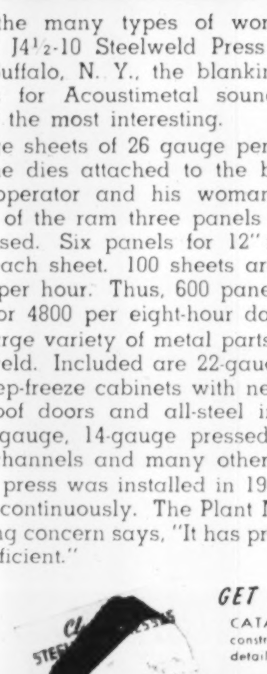
Large sheets of 26 gauge perforated metal are fed into the dies attached to the bed and ram, by the man operator and his woman assistant. At each stroke of the ram three panels are blanked out and embossed. Six panels for 12" x 24" cells are made from each sheet. 100 sheets are passed through the press per hour. Thus, 600 panels are turned out per hour, or 4800 per eight-hour day.

A large variety of metal parts are produced on the Steelweld. Included are 22-gauge stainless steel tops for deep-freeze cabinets with neatly rounded flanges, fire-proof doors and all-steel industrial doors of 10 to 14 gauge, 14-gauge pressed steel frames, heavy steel channels and many other parts.

The press was installed in 1942 and has been kept going continuously. The Plant Manager of this rapid-growing concern says, "It has proved very satisfactory and efficient."



Acoustimetal panels are produced with such speed that one man is kept busy at the rear of the press removing the scrap and a woman is fully occupied stacking the panels as they roll down the conveyor from the press bed.



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Another reason why we know so much about this job is that it's all we do. Our customers range from the "giants of industry" to the neighborhood plant, both of whose production depends upon continuous, reliable, economical performance of air and gas handling units. Because we build the exclusive *dual-ability* line of Rotary Positive and Centrifugal Units, in a wide range of sizes, we offer a *dual choice* which permits completely unbiased recommendations.

So if you have a problem today or anticipate one a year or five years from now, we suggest you call upon the facilities of R-C Specialists. Write for bulletins on any specific equipment.

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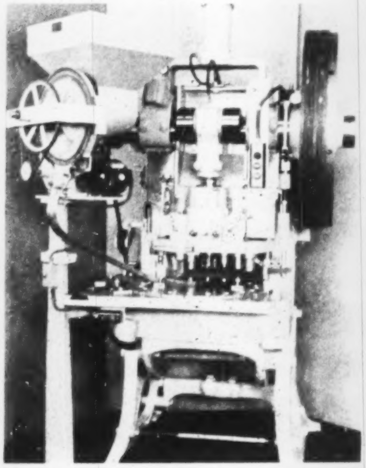
um is its resistance to cracking when being hot deformed. There have been instances of surface defects, which were missed in conditioning the billet material, opening up under the first few hammer blows. Even though the multiples were given severe reductions after the opening of the surface defects, the cracks did not propagate.



Drawing, trimming and curling of can spouts for a pharmaceutical house are performed on this long slide press with a ring type dial feed. Production is 110 completed parts per minute

Gutter — In almost all closed forgings, there is an opening all around the die impression into a cavity called a gutter. This opening is called a flash. Its purpose is to provide a channel for forcing the excess forging material in the die impression out into the gutter to allow the dies to be brought down to the proper closure.

The thickness of the flash in steel forging design is generally dictated by the size and the geometry of the forging.

Heavier Flash—This design practice holds true for titanium except that experience has indicated that for a given part the flash thickness for titanium will be heavier than for the part as a steel forging.

Reason for this is that the titanium flash as it cools in the relatively thin flash section tends to choke off the avenue of escape for the excess material resulting in a heavy forging in a plane normal to the die parting plane.

Unique — This much is certain.

Read why you should buy your special steels from Jessop

Basically there are two reasons—good quality and good service. Because Jessop is a fine name in special steels dating back to 1724, you might expect it to be covered with moss, but it isn't. Jessop is a youthful, eager team with a keen desire to produce for you better steels at a better delivery schedule than you have ever known before. Take saw steels, for example. Jessop is in the process of greatly expanding and improving its facilities in this field. It is doing so in the name of better service, but it will need more customers to keep its equipment busy. This urgency will become your profit if you order your saw steels from Jessop now. One more thing. If you are now a customer of Jessop you will agree with the statements made herein. If you are not, and have some doubts, just ask a Jessop customer. *He'll vouch for the things we say.*

HIGH SPEED STEELS • HIGH SPEED BITS • PRECISION GROUND FLAT STOCK • HIGH SPEED AND ALLOY SAW STEELS • HOT WORK DIE STEELS • COLD WORK DIE STEELS • CARBON AND ALLOY STEELS • STAINLESS AND HEAT RESISTING STEELS • VALVE STEELS • STAINLESS-CLAD STEELS • CAST-TO-SHAPE STEELS • COMPOSITE TOOL STEELS • ARMOR PLATE

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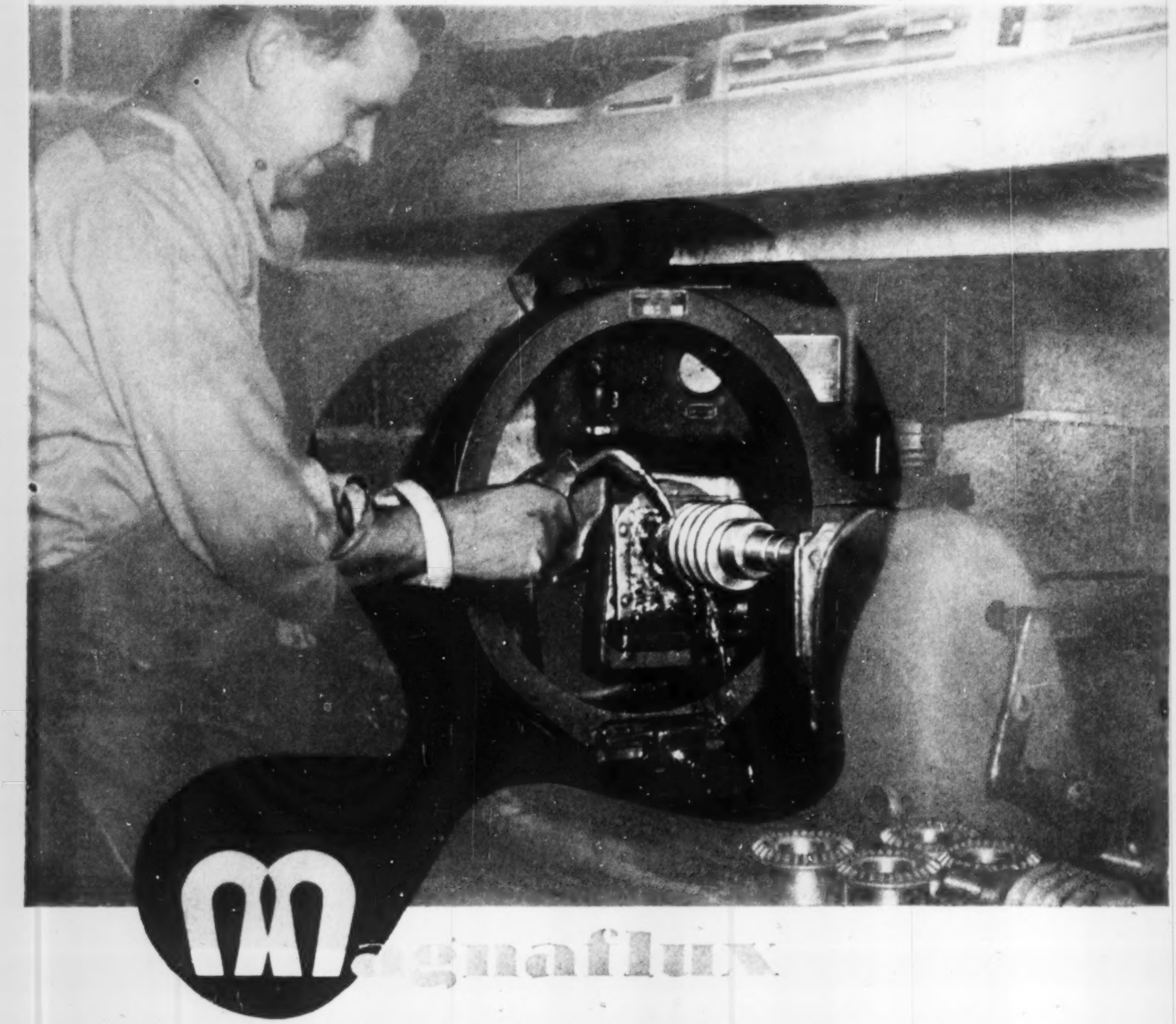

Magnaflux

The inspection with Magnaflux detects hidden defects in the structure of metals. As applied to the manufacture of BRAD FOOTE gears, Magnaflux will point out the presence of even a minute, embedded imperfection that would prevent the gear or pinion from giving the ultimate service.

- Magnafluxing is one of a series of tests and controls employed by BRAD FOOTE. It helps to perpetuate the high quality which is traditional in gears made by BRAD FOOTE. It is another reason why you can order with confidence that the gears you receive will give you complete satisfaction.
- BRAD FOOTE makes all types of gears and pinions, and many styles of gearmotors, reducers, and transmissions. Our engineering staff will work with you on the design of any special gear or assembly you may need for your shop—or for use on equipment you make to sell.
- The complete facilities of the BRAD FOOTE organization are available whether you need one or scheduled quantities. We believe you will find satisfaction in working with us: Consider sending us your next inquiry which will receive prompt attention.

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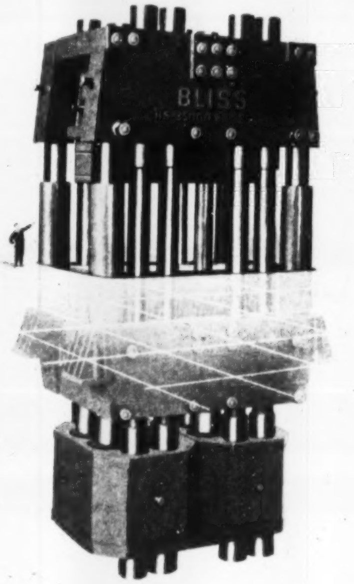
FORMING

Titanium doesn't behave according to the patterns of any other metal. Rather it's a material with its own forging characteristics.

The other new metals and alloys which are zooming into prominence, propelled by the jetomic age, will create more new problems for the metal forming industry.



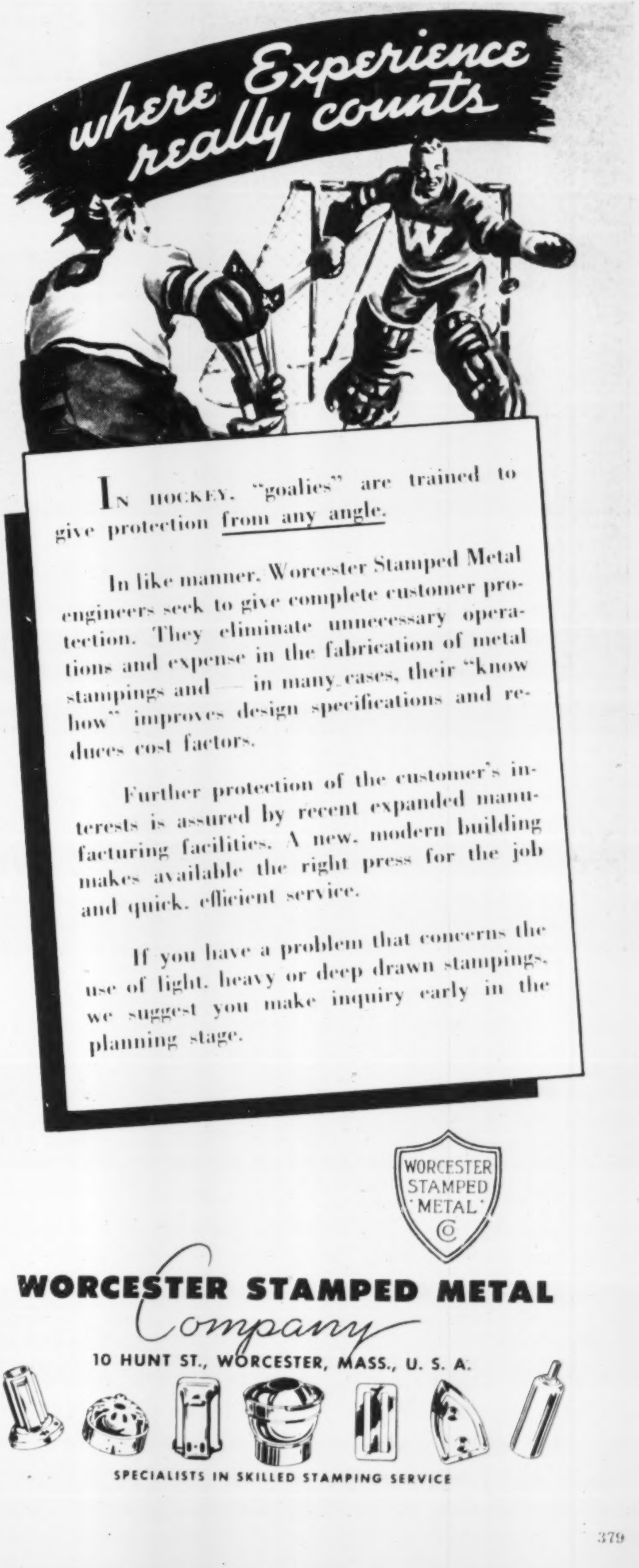
Artists conception of the 35,000-ton Bliss closed-die forging press being installed at Kaiser Aluminum & Chemical plant in Newark, O. Press stands 72 feet from the top to bottom

Heats in the Process—Electric upsetting is getting considerable attention in forging the heat resisting alloys, as a means of both increasing production and improving quality.

This is the system which induction heats the stock as it is being upset. In addition to the increased production and the better grain flow involved, another advantage shows up. It is possible to upset to 30 to 40 times the diameter of the stock.

Build-Up—Use of welding in die repairs offers considerable savings in some applications. It's used instead of shaving. When the die becomes worn a weld bead is laid on and then machined.

The drive toward economy in forging has extended to the die-making phase. Both trepanning and hot typing appear to show con-



In HOCKEY, "goalies" are trained to give protection from any angle.

In like manner, Worcester Stamped Metal engineers seek to give complete customer protection. They eliminate unnecessary operations and expense in the fabrication of metal stampings and — in many cases, their "know how" improves design specifications and reduces cost factors.

Further protection of the customer's interests is assured by recent expanded manufacturing facilities. A new, modern building makes available the right press for the job and quick, efficient service.

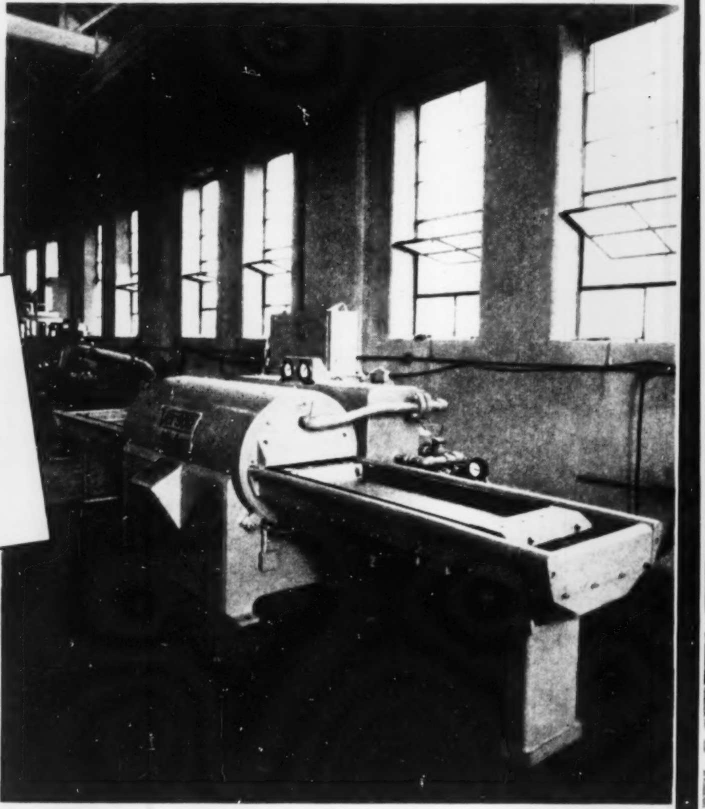
If you have a problem that concerns the use of light, heavy or deep drawn stampings, we suggest you make inquiry early in the planning stage.

WORCESTER STAMPED METAL Company
10 HUNT ST., WORCESTER, MASS., U. S. A.

SPECIALISTS IN SKILLED STAMPING SERVICE

The future of metal forming looks good with

TRADE **Verson** MARK equipment

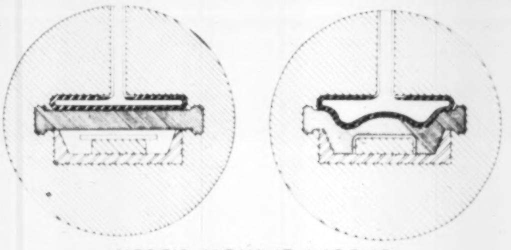


Verson WHEELON
DIRECT ACTING
HYDRAULIC PRESSES

A new concept of rubber pad forming . . . better parts at lower cost!

The new Verson-Wheelon Direct Acting Hydraulic Press brings new standards of simplicity, economy and efficiency to rubber pad forming. The unit illustrated above is capable of exerting forming pressures to 5000 pounds per square inch (equivalent to a rated tonnage of 2500 tons). Yet it is only a fraction of the size of a conventional rubber pad press of comparable tonnage . . . it costs only a fraction as much . . . requires no expensive foundation . . . and *does a far superior job,* eliminating the hand finishing usually required after conventional rubber pad forming.

A complete range of sizes and operating pressures is offered. Write for descriptive literature.



HERE'S HOW IT WORKS

The blank is placed on the single die and inserted in the press (left). A bag or fluid cell mounted in the roof of the press is inflated with hydraulic fluid. This displaces the working pad down over the work to accomplish the actual forming

A Verson Press for every job
from 60 tons up

TRADE **Verson**

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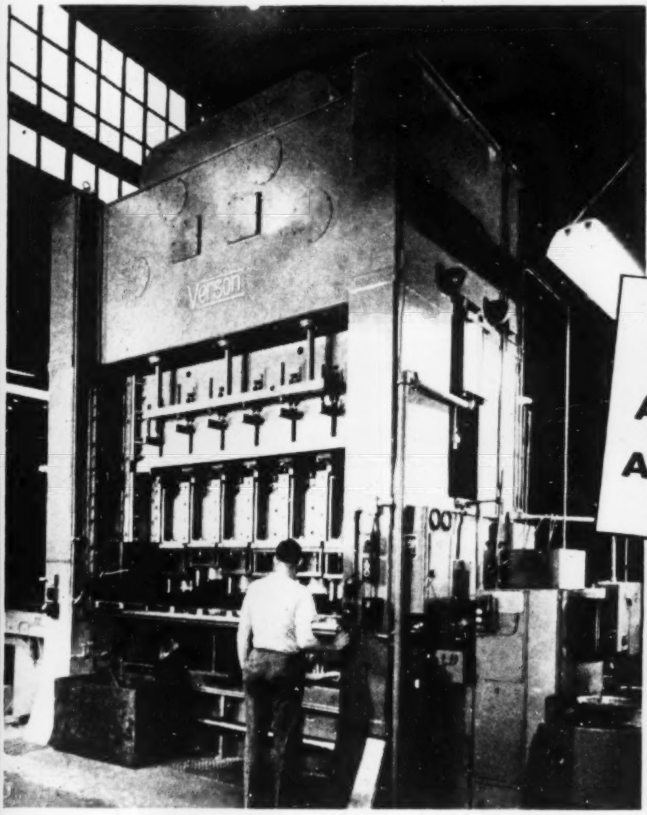

Verson TRANSMAT AUTOMATIC STAMPING AND DRAWING PRESSES

A vital tool for cutting costs in mass production industries is the Verson Transmat Press. Essentially, the Transmat is a single press with multiple die stations and separately adjustable slides. The piece being formed is transferred from one station to another by mechanical fingers — no carrying strip is required. Production is two to four times greater than when separate presses are used. Annealing and pickling between drawing and redrawing are eliminated.

If you have high production requirements for stampings requiring five or more operations, the modern, economical way to do it is with a Transmat Press. Write for descriptive brochure.

Some of the parts now produced on *TRANSMAT* presses

- *Refrigerator Trays*
- *Washer Legs*
- *Range Drawers*
- *Headlamp Housings*
- *Conveyor Track*
- *Air Cleaner Shells*
- *Trim Rings*
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ALLSTEEL PRESS COMPANY

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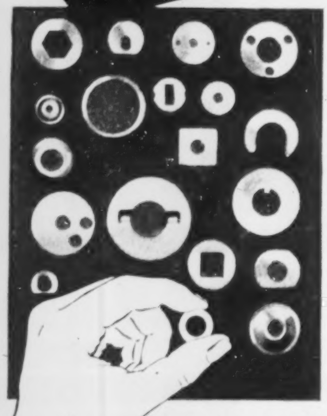
FOR EVERY NEED



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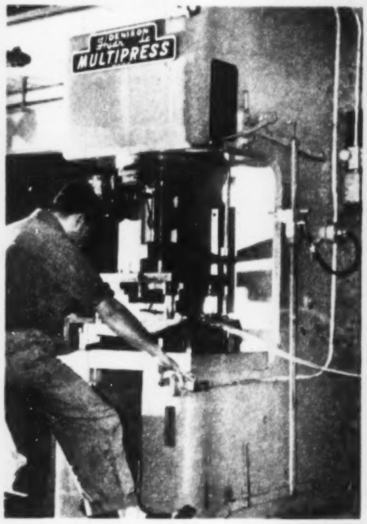
The **American Crayon** Company Sandusky, Ohio New York

siderable promise in reducing die costs.

Mention should also be made of new lubricants, including dry lubricants which are very tenacious and new lubricants with wax bases.

More Coils—Greater availability of coiled material has expanded the use of automatic feeding of stock through progressive operations and final ejection. Large volumes also permit the greater use of transfer mechanisms to automatically advance parts successively from station to station until final completion.



On this press from Denison Engineering Co., Columbus, O., hydraulics offers longer die life. Operation is blanking and forming 0.030-inch strip

Progressive die stamping operations augmented with mechanical die feeding are some of industries fastest production methods. In some cases, the limiting factor seems to be the top speed of the machine.

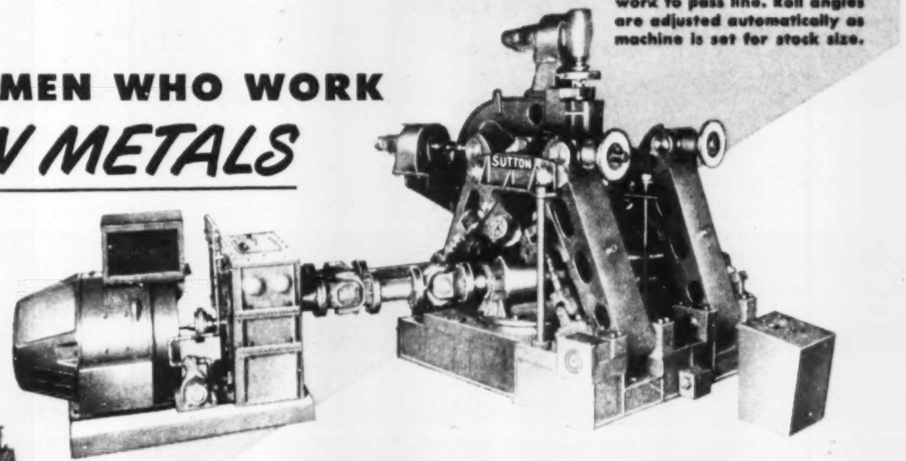
Success with which a die can be fed depends on the design of the die more than the design of the part being produced. Die should be designed with the thought that it will be used with a mechanical feed. Dies must allow stock to pass through the die without being hung up.

Powdered Metals — Metal-forming knowledge and ingenuity lends solid background to the increasingly popular powdered metal field. Use of this method threatens to

FOR MEN WHO WORK *IN METALS*

NEW SUTTON SEVEN ROLL STRAIGHTENER

For bars and tubes. Two 3-roll clusters positively confine work to pass line. Roll angles are adjusted automatically as machine is set for stock size.



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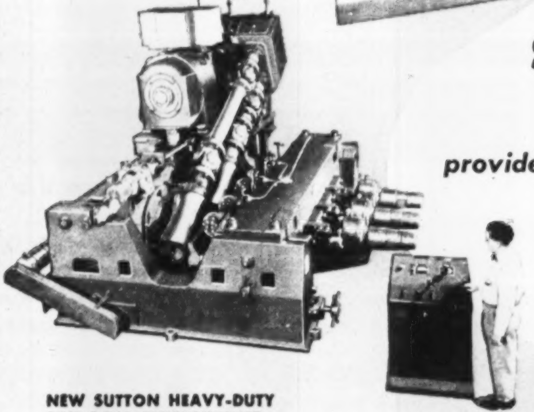
provide ... SPEED ... PRECISION ... DEPENDABILITY

You get the advantage of our years of specialized experience with every installation. Sutton Straighteners are built in all sizes for bars and tubes from ⅛" to 18" in diameter. They operate at speeds up to 1000 feet per minute.

Ask us for a proposal or for specific information about any straightening need you may have. There is no obligation for this service.

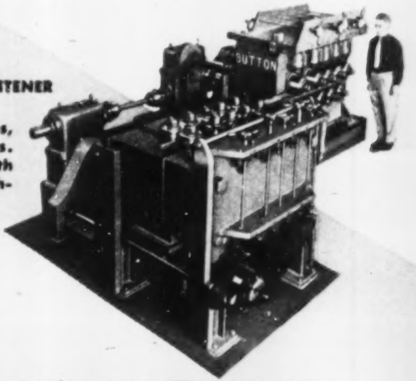


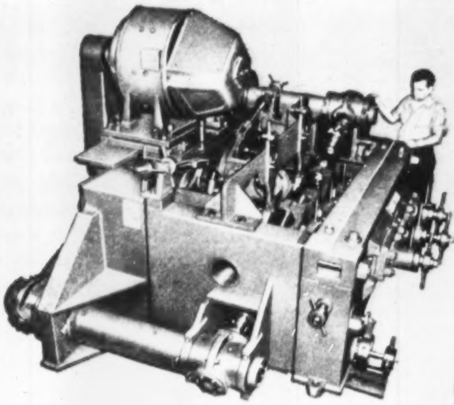
NEW SUTTON HEAVY-DUTY FIVE ROLL STRAIGHTENER

For bars and tubes. Screw-downs and roll angling adjustments are power operated.

NEW SUTTON TWO-PLANE STRAIGHTENER

For flats, squares, hexagons, angles and other shapes. Heavy duty construction with anti-friction bearings throughout.





NEW SUTTON FIVE ROLL STRAIGHTENER AND POLISHER

For cold drawn bars. Has four driven rolls. Exceptionally good for high-speed work.

SUTTON *Engineering* COMPANY

Manufacturers for Ferrous and Non-Ferrous Industries

STRAIGHTENERS, SHEET LEVELLERS, HYDRAULIC STRETCHERS, GAG PRESSES, ROTARY CLEANERS, HEAVY DUTY UNIVERSAL JOINTS, ROLLS

BELLEFONTE, PENNSYLVANIA

mushroom out into many new applications.

Biggest potential field lies in small parts now being produced as small iron castings. Some experts think metal powder can produce about 1 million tons annually in this bracket.

One factor makes powder metal processes particularly attractive. Seemingly, the more complex a part is, the more advantageously it can be made. Reason for this apparent inconsistency is that the more machining operations which are averted, the wider is the advantage gap.

One development in this field provides a means of accurately controlling density in pressing powder metal parts of varying cross-section. This hydraulic press has upper and lower cylinders which permit establishment of a definite ratio between top and bottom pressure for compacting metal powder briquets with uniform density.

This ratio is dependent upon the relationship between vertical and horizontal dimensions of the die cavity in which the part is made. These dimensions are determined by the compact's final shape and size.

A final degree of adjustment available in the travel of the upper and lower rams permits attainment of the desired final density unformly throughout the part sections.

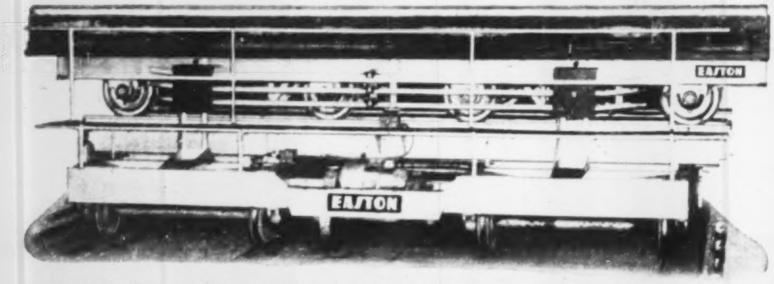
Swiss Idea—An interesting Swiss development in this field is a strong high-temperature aluminum "alloy" called Sintered Aluminum Powder (SAP).

This new sintered aluminum product shows potentialities for use at temperatures of 800° F.

SAP is produced by cold-pressing aluminum powder of fine particle size into briquettes under a pressure of 20 to 50 kg per square millimeter, sintering the briquettes at temperatures of 900 to 1100° F, followed by further hot-pressing and finally extruding the material into rods.

SAP rods can be further cold or hot-worked into sheets, shapes or drop forgings.

The powder is produced in a low-oxygen atmosphere.



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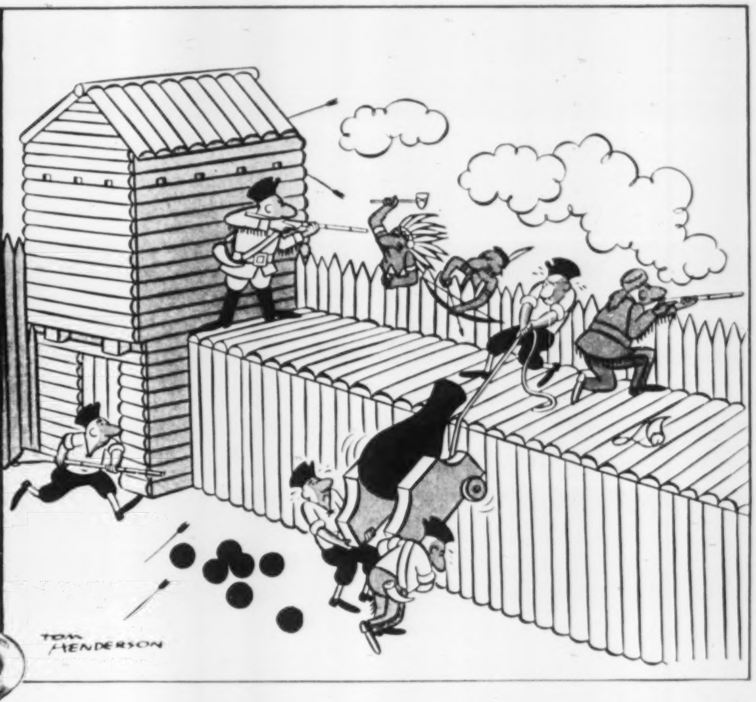

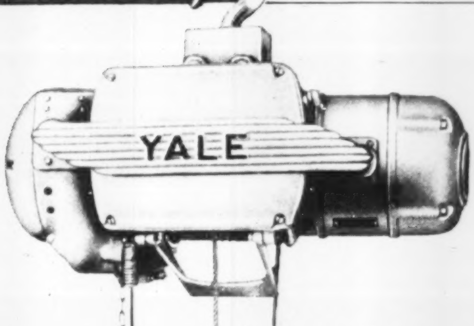

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Your YALE Distributor can give you valuable help in choosing the right hoist for your special needs—from the world's most complete line of hoisting equipment. He will recommend the modern, dependable YALE Hoist designed to solve your particular problems. Look for your local YALE Distributor in the Classified Directory. Or mail the coupon below.

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Investigating chemical polishing methods for parts having intricate shapes in the Battelle Memorial Institute Laboratories

FORUM ON TECHNICAL PROGRESS

Cleaning and Finishing

Surface treatment technology moves forward to benefit all manufacturing. Better corrosion resistance and improved appearance for products is the pay-off

NICKEL RESTRICTIONS sent platers scurrying for substitute finishes. What they found made top news for 1952 in the plating end of metal finishing.

Platers made out as best they could. Generally, this was by stretching available nickel, putting on more copper to compensate, or by using the copper-chromium finish, with no nickel, in selected applications. Now, as the nickel picture looks a little better, bright chrome plate is fully as popular as ever with manufacturers concerned with saleability of their products.

The military still is leaning heavily on plating for corrosion resistant finishes.

Manufacturers not dependent on plating to put the protective gleam on their products found organic finishes with improved durability. Coming in for more than their share of attention, were new cost-saving methods for applying organic coatings. New spray guns, higher solids, hot lacquer, better booths, faster baking—these are a few that reached the proof-of-the-pudding state.

Cleaning and surface conditioning also went ahead. Advances here are especially valuable. They benefit all branches of metal finishing.

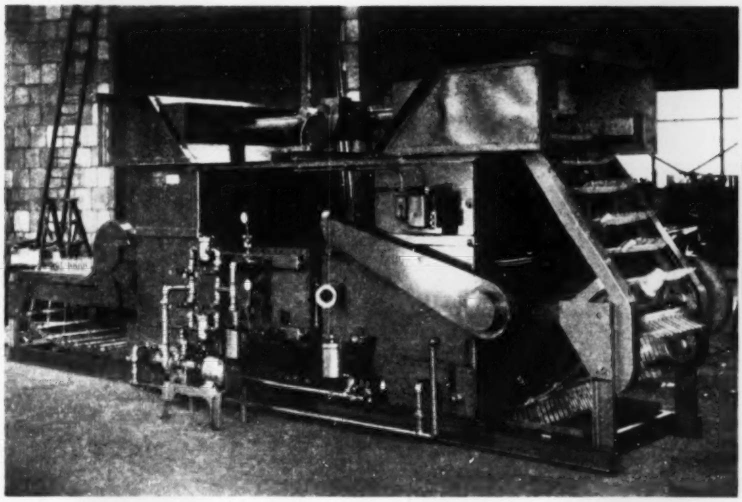
Surface conversion treatments, such as phosphating, got a little deeper into applications where they serve as the basis for a finish per se. Use of such surface treatments prior to painting also hit a new high.

Last year saw more manufacturers asking themselves if they were taking full advantage of new methods for precision barrel finishing. Parts are handled in bulk rather than individually. Result: Lower unit cost.

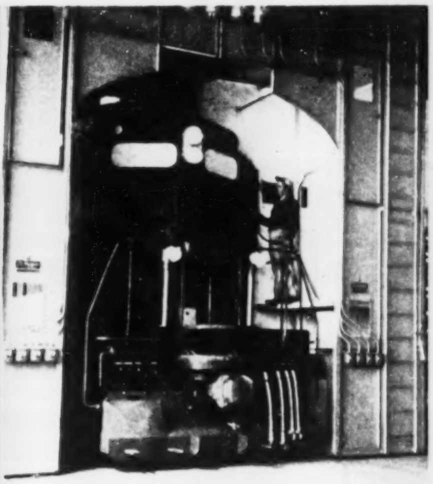
Impressive savings also were chalked up by coated abrasive belts in grinding and finishing operations.

What to Plate—What are the finishes that are being considered as a substitute for the convention-

Right one-third portion of this heavily scaled and rusted crankshaft was treated with an alkaline process developed by Enthone Inc., to clean, descale and derust in one step without pitting or dimensional change



This Blakeslee automatic vapor spray vapor model degreasing machine has a continuous conveyor of the inclined fixture type for cleaning various size cans



DeVilbiss traveling spray booth provides an exhaust chamber for finishing large portable objects such as locomotives, railroad cars, busses, and truck trailers

al bright copper-nickel-chromium plate? For the answer, let's take a look at the plater's best customer, the auto industry, considered by many to be the pace-setter for the plating field.

First one is a modified thickness version of the old standby: Copper heavier than normal, nickel less than normal, followed by chromium. Clear organic coatings may be used if needed.

Looking-Up—This scheme got a shot in the arm as a result of the amended M-80 order, late last summer. In allowing slightly more nickel for plating NPA now permits an average strike of 0.00005-inch for all parts in bright chrome finishing.

Leaves Out Nickel—Second substitute uses no nickel. Chromium is plated directly over the copper deposit. A coating of clear baked synthetic enamel is advisable for outside exposure.

General Motors Specification 4370-M covering copper-chromium finishes was revised in July 1952. Typical of the requirements setforth for steel is 0.0003-inch copper, followed by 0.000010-inch chromium and 0.001-inch clear baked enamel for interior parts. 0.0005-inch of copper is specified for exterior use and 0.0008-inch for exterior parts vulnerable to action of gravel.

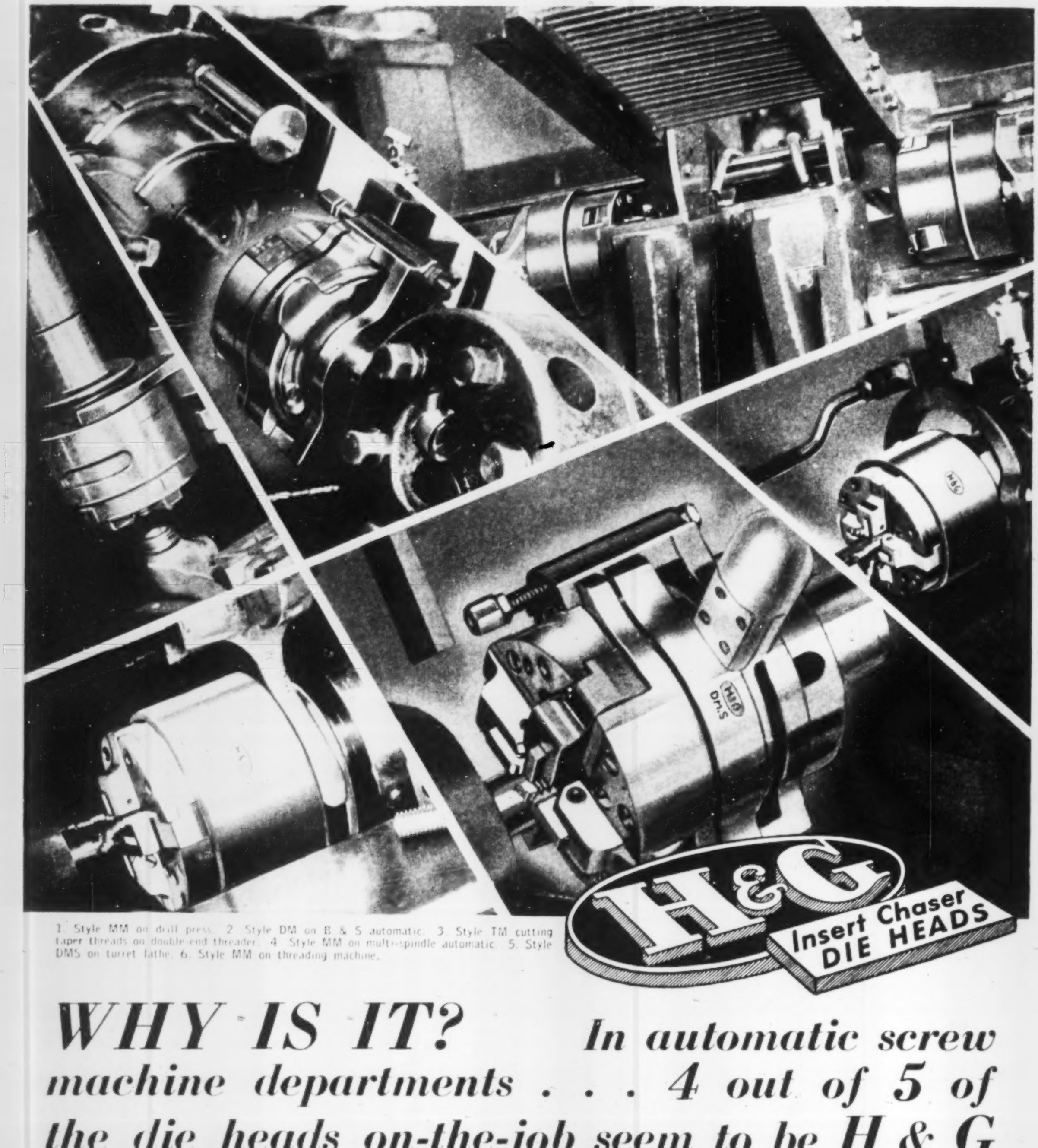
These parts were treated in Parco Black solution developed by Parker Rust Proof Co. to convert iron and steel surfaces to a black phosphate nonmetallic coating which improves appearance and corrosion resistance

Copper Gets Better—Need for acceptable methods of applying chromium directly over copper, in many cases without buffing, accelerated significant improvements in deposition rate, brightness, and smoothness in cyanide copper plating. Factors contributing to these improvements are new addition agents and bath formulations, use of diaphragm tanks, and the application of periodic reverse current. These improvements in copper plating, of great importance during the present nickel shortage, will certainly be retained and further refined.

No Chromium—Third on the substitute list is bright zinc, chromated to give a bright passive film. This finish uses no chromium plate. A clear organic coating appears necessary for outside exposure. For less severe exposure it may or may not be used.

Most recent technical developments in zinc plating include the supplementary brightening and passivating treatments designed to increase brightness, inhibit formation of white corrosion products and improve adhesion of organic coatings. Use of zinc plating in finishing will continue to grow.

Bright but Different—There are several proprietary processes for producing bright chromated zinc



1. Style MM on drill press. 2. Style DM on B. & S. automatic. 3. Style TM cutting taper threads on double-end threader. 4. Style MM on multi-spindle automatic. 5. Style DMS on turret lathe. 6. Style MM on threading machine.

H&G
Insert Chaser DIE HEADS

WHY IS IT? In automatic screw machine departments . . . 4 out of 5 of the die heads on-the-job seem to be H & G

You'll find other makes on the premises . . . tucked out of the way on the floor, on a nearby bench, on the foreman's desk, on the second shelf of the tool crib . . .

But, *on the job, cutting threads,* it is H & G.

Why this preference? What accounts for it?

It could be that producers of threaded parts find H & G more economical for threading by virtue of the low cost of insert chasers.

It could be that set-up men and operators have less trouble, less rejects, less downtime . . . with H & G Die Heads.

It could be the better class of threads . . . clean-cut, straight, true and accurate to micrometer dimensions, produced by H & G Die Heads.

It could be the interchangeability of H & G insert chasers, permitting jobs to be shifted from machine to machine, reducing the money tied up in inventory and the space required.

It could be the sum total of all these advantages that make the H & G Die Head most wanted by operators working for efficiency; most wanted by management, working for profits.

If you are not enjoying these benefits, may be you can do something about it. Write for Bulletin: How to Select the Proper Die Head for the Job, and mention make of machines operated.

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would
you use?

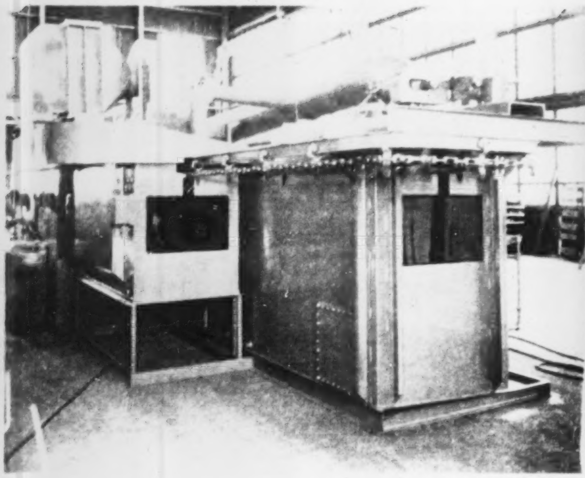
THERE ARE many things to consider when selecting a Sleeve Bearing. Johnson engineers appraise service conditions carefully: load, shock, speed, temperature, lubrication, corrosive conditions and other service considerations. Based on these studies, they will recommend the Sleeve Bearing to suit the application. Since Johnson Bronze produces bearings from cast bronze, cast aluminum alloy, sheet bronze, bronze on steel, babbitt on steel, babbitt on bronze, powdered metal and graphited bronze, a wide variety of Sleeve Bearings is available, and can be recommended without prejudice to any one type. If you are in doubt about the bearing to specify, ask Johnson Engineers. No obligation. Write today.

JOHNSON BRONZE COMPANY
550 South Mill St., New Castle, Pa.

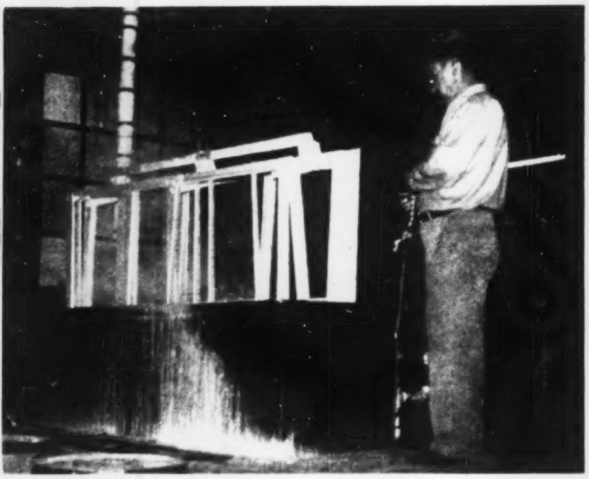
JOHNSON B BEARINGS
Sleeve-Type

BRONZE ON STEEL
copper lead
STEEL BACK
babbitt lined
BRONZE BACK
babbitt lined
CAST BRONZE
ALUMINUM ALLOY
LEDALOYL
powder metallurgy

SLEEVE BEARING HEADQUARTERS SINCE 1901



Multi-stage Detrex combination cleaning and rust-proofing machine equipped with self contained monorail conveyor. Loading station at right; unload at left



Aluminum frames and sashes are treated in an Oakite solution to remove smut and give a satin texture in finishing operation at Chamberlin Co. of America

coatings. The finish is being used in a number of products such as stove and refrigerator parts, hospital beds, ice skates, fan guards, business machine parts, bicycle rims and the like.

The color, though brilliant when properly applied, is somewhat different from that of chromium plate. Perhaps, for this reason, it has not found wide use in the automotive field.

White Brass—Another finish to appear on the scene, is the sequence copper, white brass, followed by chromium. Some platers skip the preliminary copper coat. A clear organic coating may or may not be needed depending on use conditions. White brass is not recommended for outdoor use without an organic coating.

A number of white brass baths are in operation, handling a variety of parts. White brass deposits, generally, contain about 20 per cent copper and 80 per cent zinc and are plated fully bright to serve as a base for chromium coatings. Experimental work is now being done with deposits containing considerably more copper in order to reduce brittleness of thick deposits and to minimize formation of white corrosion products.

Auto Uses Scarce—White brass has not found general acceptance in the automotive field up to now. It is being used on small standard parts such as Philips head screws, which because of the deep depression in the heads, cannot be plated with the copper-chromium sequence. It is also used on a scattering of other inside parts.

General Motors has recognized the finish to a degree and has established specification GM-4390-M which covers small standard parts intended for interior use. White brass plate must range in thickness from 0.0002-inch minimum to 0.0003-inch maximum. Chromium is deposited to a minimum thickness of 0.000010-inch. The limitation of 0.0003-inch maximum thickness is a recognition of the tendency toward brittleness as the deposit is known today.

Where We Stand—For the many applications involving severe exposure white brass must be considered an inferior substitute rather than a satisfactory alternate for bright nickel plate.

There are, however, a number of applications involving mild exposure for which chromium plated white brass may prove to be satisfactory. Among these are: Bicycle parts, toys, tools, metal furniture, novelties, interior automotive hardware and trim, picture frames, luggage, hardware, bells, casket hardware, screws, handbag frames, electrical fixtures, vending machine trim, buckles and decorations. One estimate is that about 80,000 gallons of various proprietary white brass solutions are now in production use.

All Agree—No finisher will argue this point: Metal surfaces must be clean for any finishing process. Last year produced added evidence that the cleaner and cycle must be suited to the metal and degree of cleanliness required.

How Clean Is Clean?—This is the question cleaning technologists are asking themselves as they look at new cleaning compositions. Investigators can now assign a numerical value to the cleaning action of a detergent solution.

Precise methods are being used to test immersion and electrocleaners for steel using radioactive stearic acid as a soil. Minute amounts of soil remaining on metal surface may be "counted" after cleaning using techniques well-known by the radiochemist. It looks like the radioactive tracer method is the answer to the bottleneck that so long has hampered cleaner evaluation.

Vapors Hold the Key—It seems certain that improvements in both equipment design and solvent manufacture will continue to expand vapor degreasing as one of the most versatile and positive metal cleaning methods.

Manufacturers of vapor degreasing equipment now offer standard units designed for greater versatility and longer life. Improvements in larger conveyorized units give greater solvent economy and ease of work handling. Automatic degreasing machines are equipped with improved vapor seals that

Remove Grease and Grime in Seconds with ENTHONE *Emulsion Cleaner* 75

Heavy oil films and solid dirt are removed from steel almost instantly.

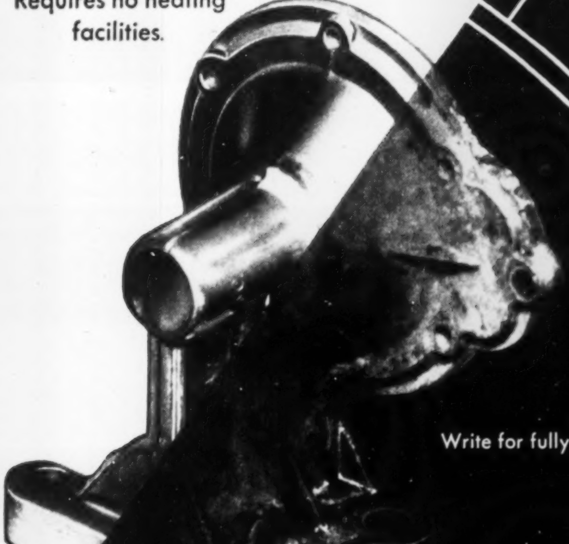
Tapped holes, slots, embossments, corners, crevices, sculptured patterns are completely cleaned.

Insures smoother, brighter, more adherent electrodeposits.

Used before phosphate coatings it minimizes coarse coatings.

Safe for operators, does not irritate nose, throat or skin.

Requires no heating facilities.



Write for fully descriptive literature.

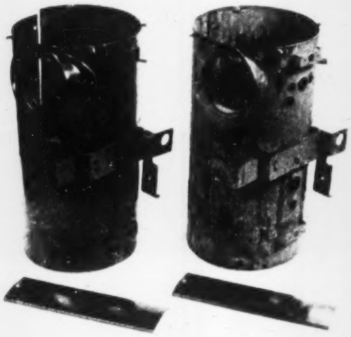
ENTHONE
INCORPORATED
442 ELM STREET
NEW HAVEN, CONNECTICUT

METAL FINISHING PROCESSES

ELECTROPLATING CHEMICALS

provide maximum work throughput with minimum evaporation area. These units also give more positive spray cleaning action than formerly was possible.

Better Solvents—Complementing improved equipment design is the development of improved quality of trichlorethylene and perchlorethylene for degreasing. Work on solvent manufacture and formulation is guided by the demand of metalworking where new lubricants and related advances in fabrication require degreasing solvents to withstand more and more rugged use conditions.



After heating to 500°F for 4 hours heater shell (left), modified silicone finished, was salt sprayed three times as long as organic finish (right)

Takes Off Tough Scale—Annealing and mill scale is removed from parts made of high nickel alloys, such as "Hastelloy" in 10-20 minutes in the sodium hydride descaling bath. Titanium and its alloys are descaled in a 10-20 minute cycle. Centrifugal castings, forged rings and blades for jet engines, weldments, nonferrous plates and small Alnico magnets are being descaled regularly.

For Derusting—During the year use was made of a new process for electrolytic alkaline derusting and descaling. Rust is removed rapidly by making parts cathodic in a solution of alkaline derusting salts. Rust and oil are removed without leaving smut or pits on parts made of high carbon steels, cast and malleable iron as well as various alloy steels. One property is particularly valuable; there is no attack on base metal. This

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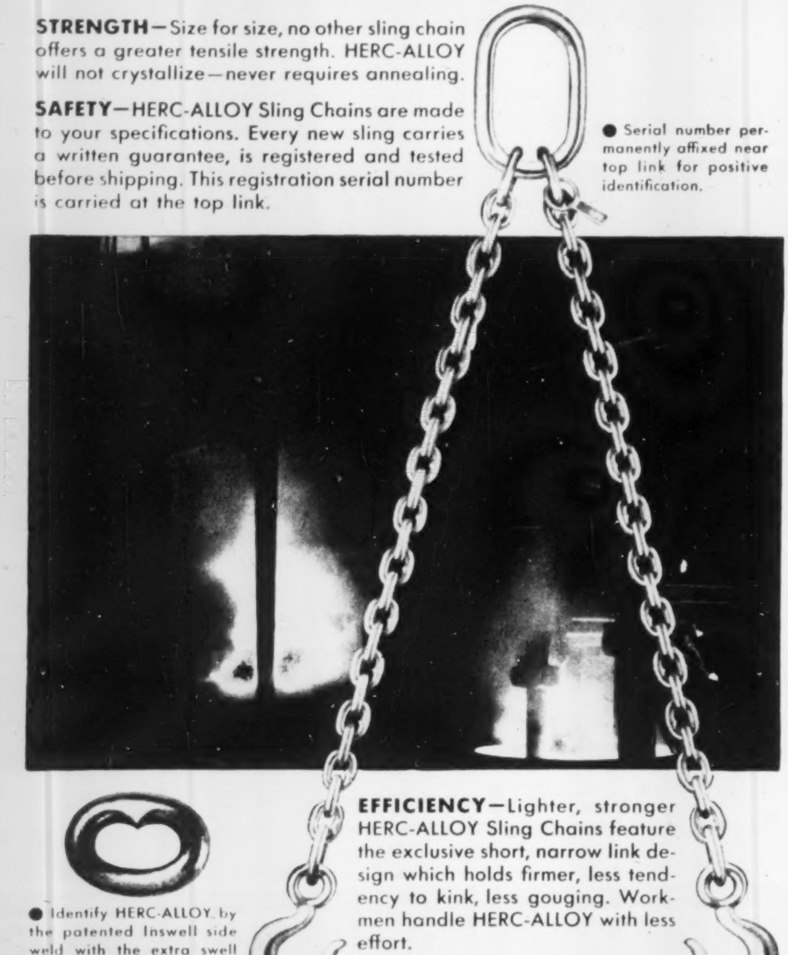
STRENGTH—Size for size, no other sling chain offers a greater tensile strength. HERC-ALLOY will not crystallize—never requires annealing.

SAFETY—HERC-ALLOY Sling Chains are made to your specifications. Every new sling carries a written guarantee, is registered and tested before shipping. This registration serial number is carried at the top link.



● Serial number permanently affixed near top link for positive identification.

● Identify HERC-ALLOY by the patented Inswell side weld with the extra swell of metal on the inside of the link.

EFFICIENCY—Lighter, stronger HERC-ALLOY Sling Chains feature the exclusive short, narrow link design which holds firmer, less tendency to kink, less gouging. Workmen handle HERC-ALLOY with less effort.

PREFERENCE—Men who buy and use sling chains are influenced only by facts learned through experience. HERC-ALLOY Sling Chain preference has been built up over the years, not just by what we say, but by how HERC-ALLOY performs on the job.

HERC-ALLOY SLING CHAIN

Write for Data Book No. 3 which contains much useful manufacturing and application information on HERC-ALLOY Sling Chains.

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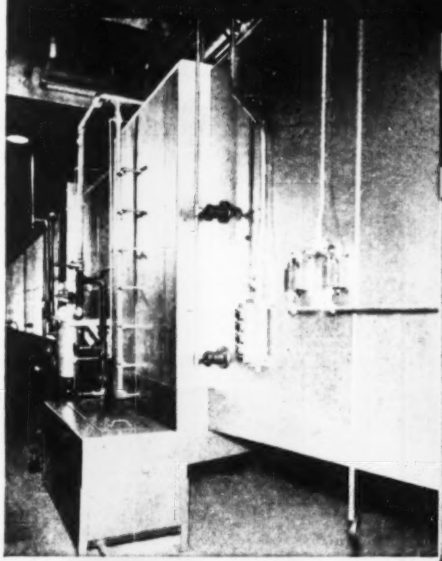
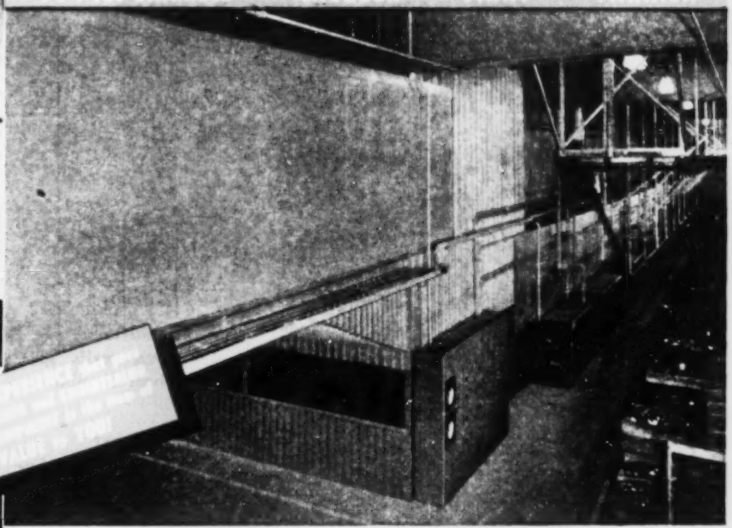
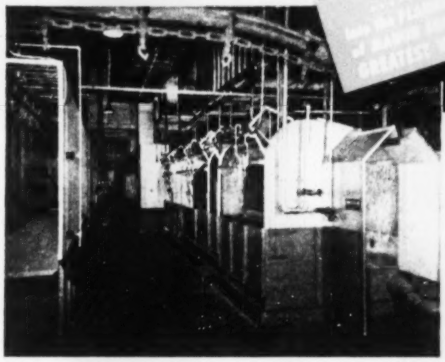
... for ENAMELS • LACQUER • PAINT • VARNISH



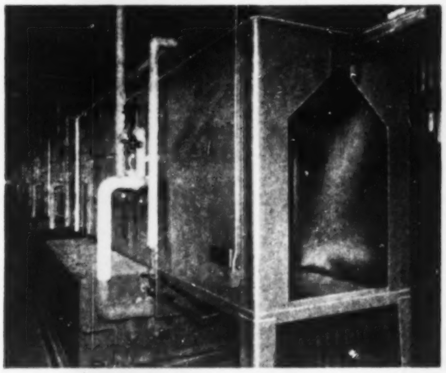
Mahon Flow Coating Machine—Part of the Complete Mahon Finishing System at Cutler-Hammer.


into the PLANNING and ENGINEERING
of MAHON Equipment is the item of
GREATEST VALUE to YOU!

High Angle View of the Complete Mahon Finishing System Installed at the Cutler-Hammer Plant, Milwaukee, Wis. Note Overhead Drying and Baking Ovens, and Enclosed Paint Room Below.



Mahon Hydro-Filter Spray Booths, and at left, Drip Tunnel of Flow Coater—Parts of the complete system at Cutler-Hammer.



Mahon Six-Stage Metal Cleaning and Rust Proofing Machine—Part of the Complete Mahon System at Cutler-Hammer.

Modern Mahon System Gives Cutler-Hammer Products FINER FINISH at LOWER COST!

The new, Modern Finishing System installed by Mahon in the Cutler-Hammer plant is very compact with an enclosed paint room fitted with plate glass windows. Drying and Baking Ovens are located overhead to conserve floor space. Provisions are made for both spraying and flow coating in order that finishing costs per unit could be reduced to an absolute minimum. This is another example of Mahon cooperation in planning, engineering and producing highly efficient, properly coordinated equipment to meet the manufacturer's specific requirements. If you are contemplating new finishing equipment, you will find that Mahon engineers are better qualified to determine your equipment requirements, and to do the all-important planning which is the key to high quality results in production finishing. Over thirty years of experience in this highly specialized field has endowed Mahon engineers with a wealth of technical knowledge and practical know-how not available to you elsewhere. In the automotive field and the home appliance field, where fine finish is imperative, you will find more Mahon Finishing Systems than all other types combined. See Sweet's Plant Engineering File for complete information, or write for new Catalog No. A-653.

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SWITCH TO FOSTORIA INFRA-RED OVENS

FOR PAINT FINISH BAKING AND MANY OTHER HEAT OPERATIONS

Production results with Fostoria Infra-red Ovens are amazing. No other heating process approaches the speed, the ease of control, the space saving, the low cost advantages of this modern equipment. Write for full facts, today!

HIGH EFFICIENCY SLASHES "PER PIECE" PRODUCTION COST!

LOWEST OPERATING COST
Puts heat into the product — not into oven walls. Uses less fuel. Gold plated interior reduces heat loss to 2%.

REQUIRES LESS FLOOR SPACE
Shorter cycles — most production for oven size. May be ceiling mounted.

FASTEST PRODUCTION
Fastest means of heat transfer. No warm-up required — no shut-off lag. Heat levels instantly changeable.

UNIFORM HEAT DISTRIBUTION
Evenray reflector oven walls give wide angle, uniform heat distribution on product.

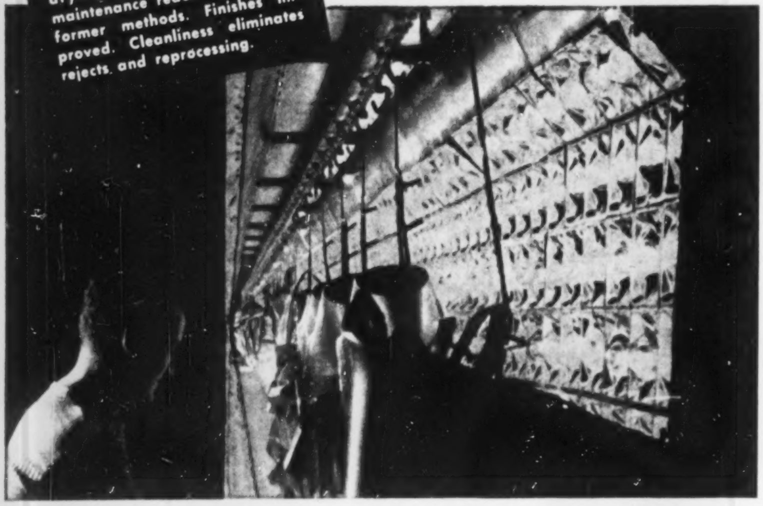
LOWEST MAINTENANCE COST
Clean operating — no combustion by-products. Lowest source replacement cost.

COMFORTABLE WORKING CONDITIONS
No room ventilation problems.

COMPETITIVE INITIAL COST
Comparable to any quality-built oven.

One of 7 Fostoria ovens at Studebaker, Canada, for finish drying. Time reduced 50%, maintenance reduced 75% over former methods. Finishes improved. Cleanliness eliminates rejects and reprocessing.

A Typical Example of Fostoria Oven Advantages



INFRA-RED fostoria OVENS

THE FOSTORIA PRESSED STEEL CORP.
FOSTORIA, OHIO, Dept. S

Please send me information on Infra-red Ovens for

Name
Company
Street
City State

allows derusting (pickling) without dimensional change.

Savings By the Barrel—If you can use it, barrel tumbling not only takes off rust and scale but does a lot more. Rising costs for hand work caused many finishers to ask themselves if they were taking full advantage of new methods for precision barrel finishing. Parts are handled in bulk rather than individually, giving lower unit cost.

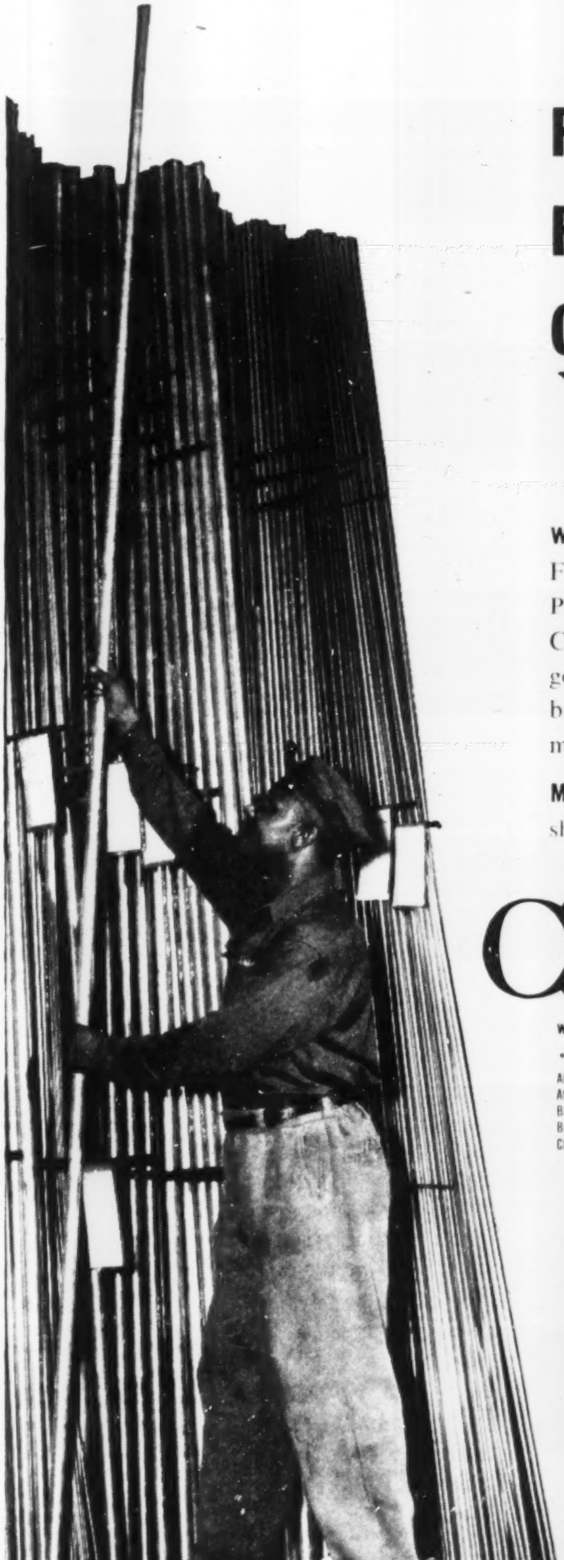
Automotive, aircraft and other manufacturers of precision metal products are using abrasive tumbling to deburr and improve surface finish. Chevrolet, Ford, and Borg-Warner Gear Division are tumbling automatic transmission parts to secure close fits and good finish.

Parts finished by precision barrel tumbling using Norton abrasive

Use a Belt—Whether it's contour finishing, polishing or stock removal, more and more manufacturers are finding that abrasive belts save them money. One big advantage is the high speed at which they may be run due to their inherent cool-cutting action.

Prefinishing of auto steel prior to forming with coated abrasive belt grinders is looking up. Grinding or scouring methods to develop prefinished strip steel holds promise for manufacturers of other metal products produced from strip. Today, mirror bright finishes are being produced on stainless steel used for trim by the strip scouring method.

Treat the Surface — Expanded use of several types of phosphate coatings in finishing and rustproofing was evident in 1952. For some products, such coatings suitably processed and aftertreated are used instead of plated or organic finishes.



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What kind of copper or copper alloy do you need? Free-cutting brass rod? Sheet and strip brass? Phosphor bronze for springs? Call your nearby Chase warehouse. We can supply you, subject to government controls, with the widest variety of brass or copper materials for production, maintenance or repair.

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Close tolerance sawing, slitting, shearing to your specifications.

Stocks of tube, rod, bar, strip, sheet and wire in a variety of alloys.

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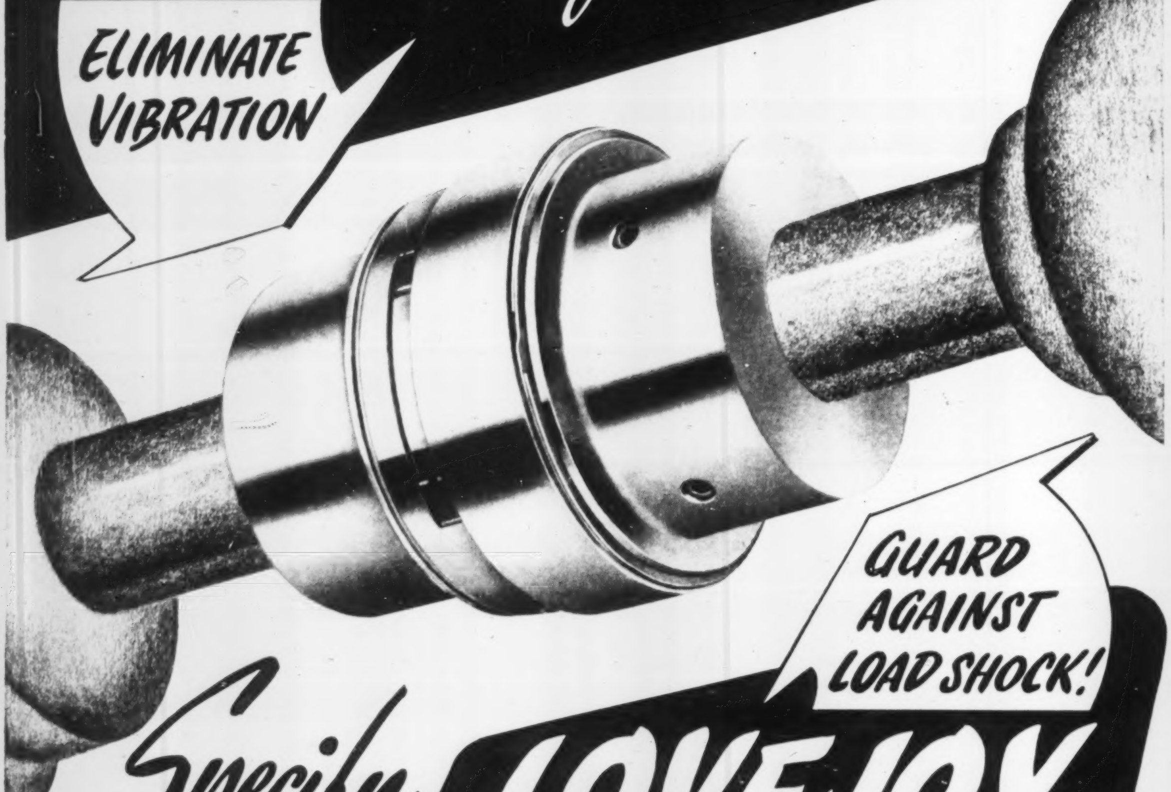

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Note the compact, accurately machined bodies and jaws—the special cushioning materials—and you'll see why Lovejoy spells the end of your "down-time" worries . . . why misalignment, backlash, and surge are reduced to a bare minimum.

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CLEANING AND FINISHING

Dual purpose compounds are being used which both clean and phosphate coat in one operation. Single stage of any standard two or three stage washer can be utilized. Work comes out of the washer clean and with a phosphate-coated surface which increases rust resistance and serves as a paint base.

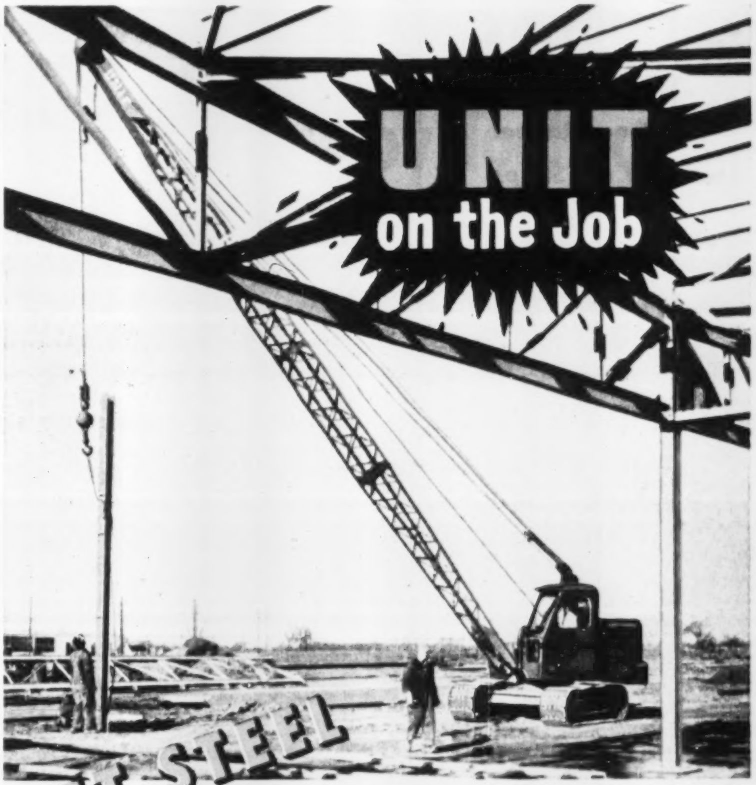
Black Surface—A new process converts iron and steel surfaces to a non-metallic black phosphate coating which materially increases the corrosion resistance of the treated part. It is being used on bolts, nuts, clips, hardware, nails, washers and the like.

Going Ahead—A number of improved chemical treatments for aluminum made their bid for top honors. Modified phosphate and chromate type coatings forged ahead in civilian and military uses. Suppliers are shooting at versatile treatment methods and shorter time cycles, as well as improved corrosion resistance.

Keeping Up with the Times—Organic coatings have not been caught napping. Quite the contrary: New application methods coupled with new materials put them close to the head of the parade.

New and improved resins have boosted the durability of film formers—the backbone of organic coatings. Alkyd resins are still probably the most useful. Proper pigmentation gives attractive finishes of high depth and luster in practically any desired color. Other salient properties: High gloss, good weathering and gloss retention over long periods of exposure. Alkyds were widely specified by the military for equipment during the year. New styrenated-alkyds are used for fast drying ammunition coatings.

For Hot Spots—Silicone-alkyd finishes are No. 1 for uses where heat is involved. Applications are increasing for this finish which holds on to metal at temperatures of 400 F to 500 F. Hardness, abrasion resistance, adhesion, flexibility and high resistance to solvents, acids, alkalis, gasoline, and grease are properties that will foster expansion of silicone modified finishes in applications where



SET STEEL - *Easy and Fast with* **UNIT**

Lifting, carrying and spotting steel girders into the exact position requires STABILITY — FLEXIBILITY and PERFECT CONTROL. A UNIT Crane gives you all these features . . . and more. Extra Long Crawlers — Multiple Hinged Shoes — Wide Axles and Hook Rollers provide perfect stability. Smooth accurate control of boom and hoist lines permits precision handling. UNIT'S FULL VISION CAB gives the operator excellent visibility . . . makes steel setting jobs easier and faster. UNIT equipment can be quickly and easily converted to handle a wide variety of work. To speed up your steel construction, investigate UNIT. Write for literature.

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1/2 or 3/4 YARD EXCAVATORS . . . CRANES UP TO 20 TONS CAPACITY
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SHOP TIPS

New, Free Magnet Idea Kit for Shops

Magnet
IDEAS
CARBOLOY

A handy new literature kit showing the hows and whys of permanent magnets is currently sparking shop men to real savings in time, money, effort.

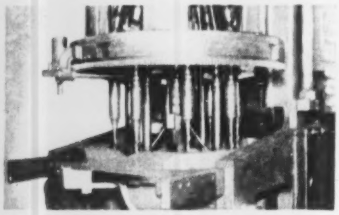
To date, the magnets have proved very effective as sheet steel separators, magnetic stands, tool-holding devices, sweepers' "pickup" tools, paper grippers and tool retrievers, to name a few uses.

Magnet Idea Kit can be obtained free from Carboloy Department of General Electric Co. (See address at right.)

* * *

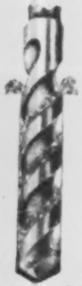
Drill Cast Iron with Carbide Twist Drills

Drilling cast iron with carbide twist drills is definitely past the "maybe" stage. Users report doubled production, more than tripled drill life over H.S.S. drills, without any special drilling equipment or job engineering. Sound, how-to-do-it technical bulletins available free. Write Carboloy Department of General Electric Co. (See address at right.)



* * *

New Masonry Drills Won't Stall, Pack



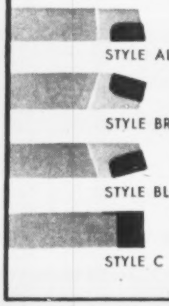
An outstanding advance in rotary drilling of masonry was recently unveiled in Carboloy oval-flute "Live-Spiral" Drills.

The drills, tipped with Carboloy cemented carbide, won't stall or pack even at very rapid speeds. They work equally well in concrete, brick, plaster, slate or asphalt. For full details write Carboloy Department of General Electric Company. (See address at right.)

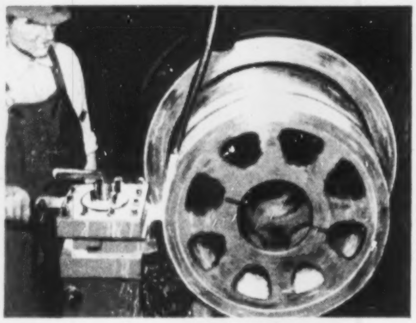
YOUR CARBOLOY FIELD ENGINEER SAYS—

We can help you get swift tool-

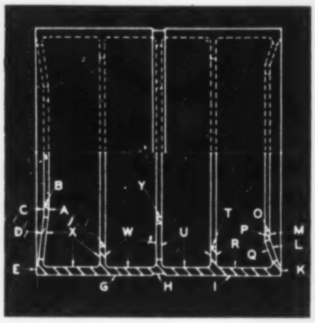
Here's how one leading manufacturer quickly adapts low-cost Standard Carboloy Tools to his single-point tool machining operations — jobs that would normally require costly "specials" — and gets them on the jobs *in minutes*. No special grinding equipment. No delays or heavy inventories. By standardizing on "Standards," he gets full carbide benefits shop-wide — just as you can. Check these pages. Then send me blueprints of your tough single-point tool jobs. We'll show you how easily "Standards" can be best for you, too.



1 Gets 14 "specials" from these 4 styles of "Standards" — A large Midwestern manufacturer (name on request) needed 14 specially shaped tools for a rush job on cast steel gear blanks. From their stocks they selected the 4 Standard Carboloy Tool styles shown . . . ground them to the shapes needed in minutes per tool. No long waits for costly "specials," no extra expense or production delays. (See illustrations, below and on right-hand page.)

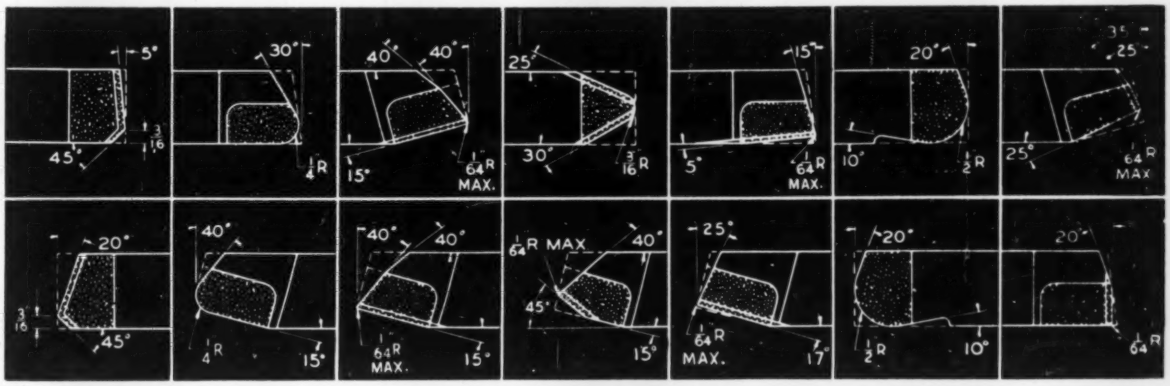


Here is the job — a tough steel casting 26" in dia., 28" wide, and requiring a wide variety of rough and finish turning, facing and boring operations.



Sketch of side view of part showing many of the single-point tool machining operations necessary for the job.

convert to Standard Carboloy Tools and
ups, low inventories, lowest tool cost



Dotted lines show the original tip ends of the 4 styles of Standard Tools before they were ground to these 14 special shapes in minutes

2 **Easy for you to use, also** Adapting Standard Carboloy Tools to your special-tool needs is a cinch. They can be rough-ground quickly on ordinary silicon carbide wheels, finished economically on diamond wheels. Standard Carboloy Tools stay sharp up to 10 times as long as high-speed steel tools, last 10 times longer, too.

3 **You get quicker tool-ups** You'll cut tooling delays to minutes instead of days or weeks with "Standards" on your shelves. Your inventories will be lower—costs, too. Just 11 styles of Standard Carboloy Tools can be adapted to do up to 80% of all your single-point tool machining.

4 **You enjoy plant-wide benefits**—Let us help you convert to standard styles of Carboloy Tools for plant-wide benefits. Thousands of shops have done so . . . and now profit from such things as production gains of up to 300%, downtime savings that alone more than pay for the entire cost of the tools.

To get maximum performance from Standard Carboloy Tools, we have the industry's best all-around Carbide Service Program. Includes all types of free how-to-do-it technical data, a tuition-free training school, etc. For details, mail coupon today.

5 **Send blueprints of your "specials"** Let us review your single-point tool machining jobs that now require costly special tools . . . show you exactly what "Standards" can be adapted, and how. Send blueprints today to the factory at Detroit, or to your nearest Carboloy District Office. No charge or obligation. See coupon below.

CARBOLOY TOOLS ARE STOCKED COAST TO COAST BY

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MAIL COUPON TODAY!

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11141 E. 8 Mile Blvd., Detroit 32, Michigan

Gentlemen: Please send me, at no cost or obligation, Carboloy General Tool Catalog, GT-250.

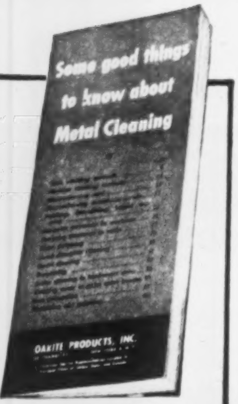
☐ Also, I am enclosing ( ) blueprints or sketches of the single-point tools we use. Show me, free of charge, which low-cost Standard Carboloy Tools can be quickly ground to these special shapes (and how to do it).

Name Position

Company Name

Address

City Zone State



Which of your metal-cleaning jobs would you like to improve?

Listed below are some of the operations discussed in Oakite's new 44-page illustrated booklet on Metal Cleaning. Please check the list. Then let us show you how Oakite materials and methods can give you better production with greater economy.

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heat is not of prime consideration.

Epon based finishes have just appeared on the scene. They have excellent chemical and weather resistance and a degree of heat resistance. Keep your eye on epons for improved finishes in the future.

Guards Surface — Vinyl resins take credit for a new anticorrosive wash primer or under coat for use on steel, aluminum, and galvanized surfaces. New primer consists of vinyl butyral resin, zinc chromate and phosphoric acid. It dries fast. Military uses have been particularly impressive. Mil-P-15328, just issued, specifies its use as a standard primer for ships. Look for real advances in this principle for corrosion control.

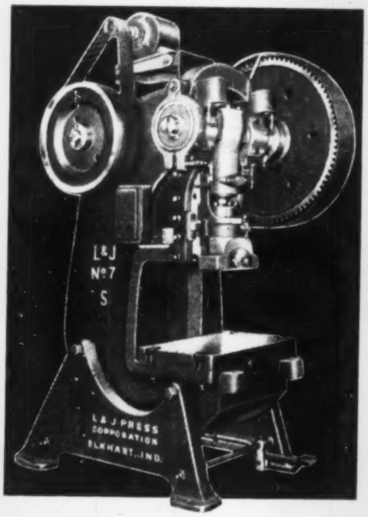
Roughing and polishing auto grilles before plating using abrasive belt

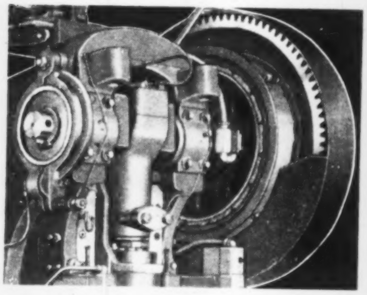
Putting It On—More and more finishers are cashing-in on new application methods.

Hot spraying, using heat as a viscosity reducing agent, continued to make progress. In those places where it is properly put into practice, results show the potential benefits of the process. Labor and material savings can be realized and at the same time the quality of the finish may be improved.

To secure large unit production at low cost and to insure continuity and uniformity of finish more and more manufacturers are employing completely automatic spray finishing equipment.

Electrostatic methods have con-





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When you order sheet by gauge number the permissible A. I. S. I. variation in thickness is plus or minus 10%. Thusly, if you order 18 gauge, you may receive a sheet .052 thick when .0475 would suit your purpose. Using a standard 18 gauge 36"x120" sheet as an example, the theoretical weight is 63 pounds, but this weight could permissibly vary between 65.52 pounds and 59.22 pounds.

A sheet of MicroRold .0475 thick with a tolerance of only 3% would weigh 59.85 pounds thus insuring a saving of 3.15 pounds from the theoretical average-weight, or 5.67 pounds from the maximum, while still remaining within the 18 gauge ordering range.

Weight of One Sheet
of 18 Gauge 36" x 120"
Plus or Minus 10%

.052"—65.52 Pounds
.051"—64.26 Pounds
.050"—63.00 Pounds
.049"—61.74 Pounds
.048"—60.48 Pounds
.047"—59.22 Pounds

Theoretical Wt.
63.00 Pounds

Weight of the same size sheet of .0475 plus or minus 3% is 59.85 pounds with an average saving of 3.15 pounds per sheet.

Multiply this saving by the number of sheets you use per month and the price per pound and you have a good dollar and cents reason for buying MicroRold.

** Each additional 1/1000" of thickness adds 1.26 pounds weight per sheet.*

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tributed to economics of spray and dip coating methods. Newcomer to this field is electrostatic atomization. This process uses no air for atomization. The part attracts the paint in the quantity required.

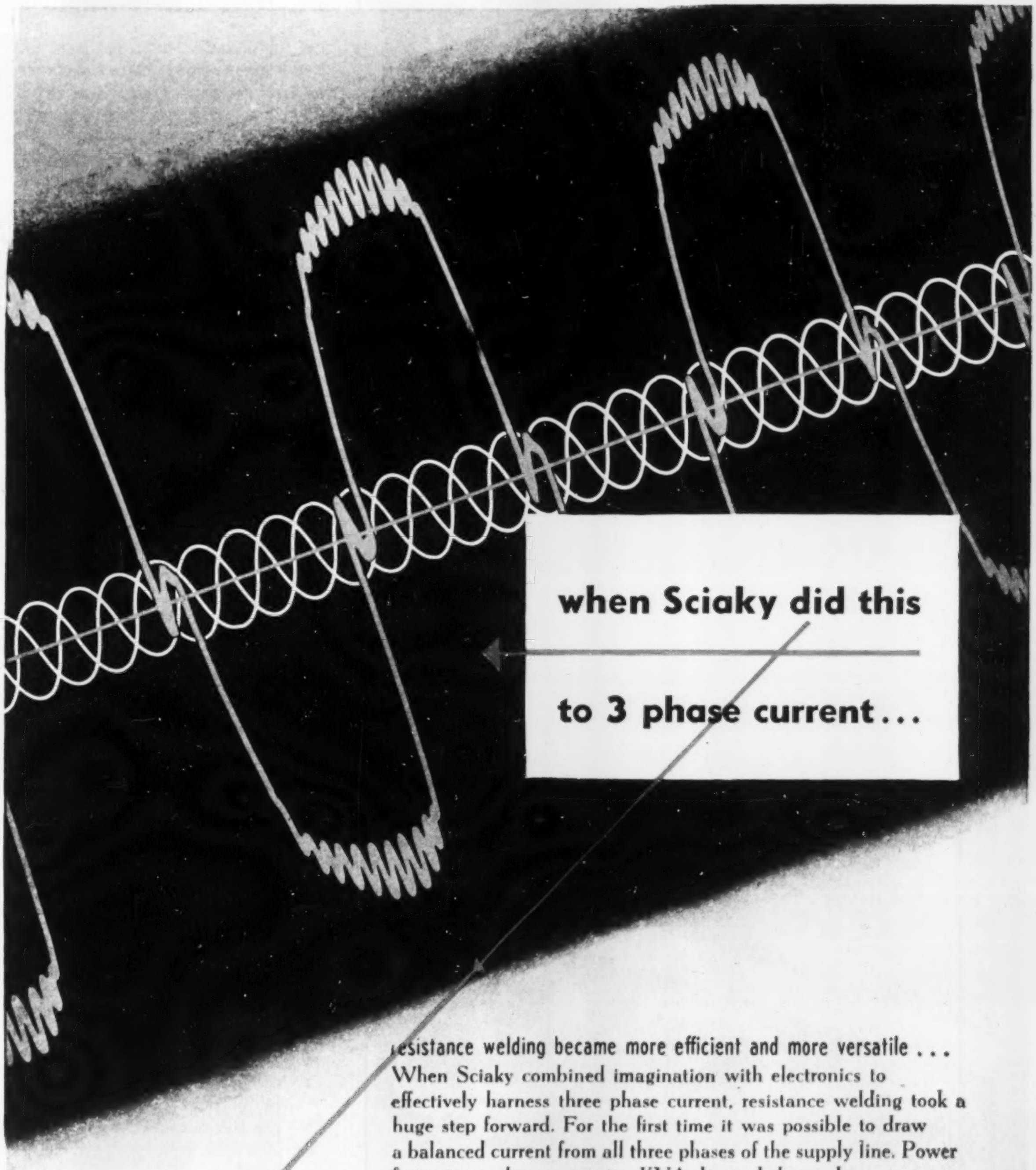
Traveling Spray Booth—Taking the form of an inverted "U" this new type spray booth straddles such objects as locomotives, railroad cars, busses and truck trailers and travels under its own power along the length of the object while it is being finished. On each side of the booth is a shallow chamber fitted with an elevator type of platform with push-button control for the painter to work at any level. The new unit effects savings in operation and maintenance over the requirements of other equipment for spray finishing large objects.

A heat resistant porcelain enamel coating protects turbo supercharger part against oxidation and corrosion

Hot-Dipping — In galvanizing, further effort has gone into developing mechanical drossing for shop use. Known as the "sweep, conveyor, vibrate and mold method," mechanical removal is based on the principle that dross migrates from one end of the pot to the other with the flow of production.

The year saw a new aluminum hot dip coating process take its place in production line applications. Used to coat fabricated assemblies of ferrous base metals for corrosion resistance at elevated temperatures, it has substituted for strategic high temperature and stainless alloys in some parts.

Dual Front—Porcelain enamels went forward in both defense and civilian applications. Heat resisting porcelain enamels are applied on aircraft exhaust systems and heat exchangers. These new coatings are also used on heat exchang-

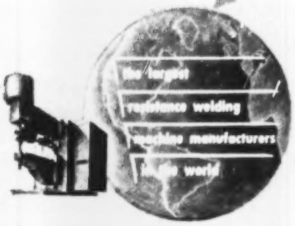


when Sciaky did this

to 3 phase current...

resistance welding became more efficient and more versatile . . . When Sciaky combined imagination with electronics to effectively harness three phase current, resistance welding took a huge step forward. For the first time it was possible to draw a balanced current from all three phases of the supply line. Power factor jumped to near unity. KVA demand slumped as much as 50% or more of previous requirements. But most important, resistance welding became more versatile. By simple adjustments one machine could weld many different metals in a wide range of thicknesses.

This is the type of engineering that keeps Sciaky out in front . . . makes the Sciaky name the symbol of the best in resistance welding.



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Shown here are only a few of the many standard types available write for complete catalogue and other technical data

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ers for domestic heating units. Exhaust pipes and mufflers for trucks, as well as many larger size motor silencers, are being produced with a porcelain enamel finish.

Conventional porcelain enamels have been steadily improved in qualities for the various domestic uses, such as refrigerators, stoves, washing machines and clothes driers. Emphasis now is on selection of correct enamel to give optimum qualities for a particular application. Thickness is reduced to give optimum for abrasion and corrosion resistance.

Coming in the near future is a special treatment for sheet iron to eliminate ground coat for white or colored enamels.

New Tints—Luminescent porcelain enamels are making a show for themselves. Outstanding property is weather resistance. Whereas luminescent paints have a life of three to six months, the porcelain enamels are durable for three years.

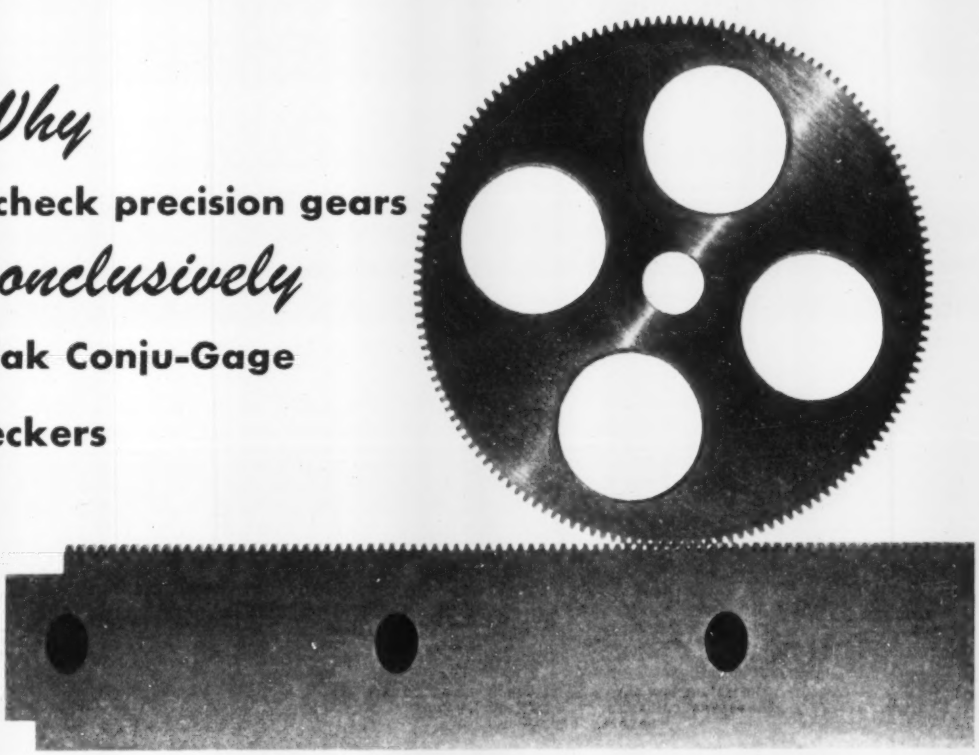
Something else new—titanium cover coats with pastel colors built in. They are especially noted for their acid resistance and stability of color. Prospective uses are on bathtubs, sinks, architectural installations, refrigerators, etc.

Enameling of aluminum has progressed rapidly during the past year. Porcelain enameled aluminum sheets may be sawed or bent. The enameled aluminum market includes wall and ceiling panels, siding, roofing, tile, pipe, tanks, appliance parts, and marine supplies.

Oil and Wax Coatings—New oil and wax coatings give better corrosion protection with thin film thicknesses. Specific anti-rust additives, in most cases, are responsible for the improved performance. Value is due, in large part, to water displacing characteristics. Emulsion type wax coatings are being used especially where there is carry over of water into the wax solution.

In some cases a dry surface is required prior to the application of oil or wax coatings. Products are available which when added to the final hot water rinse speed up drying time and leave an invisible film which will inhibit staining during the drying period.

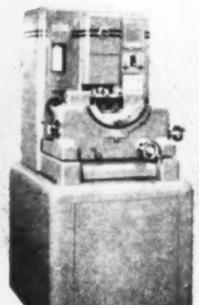
Here's *Why* you can check precision gears *more conclusively* with Kodak Conju-Gage Gear Checkers



Why the composite check

Errors in gears seldom occur individually—they're usually combinations of as many as six types of errors. The practical way to test gears for these errors is to test them in action through the composite check recommended in the new American Standard (AGMA 236.02; ASA B6.11-1951).

This check measures gear errors as variations in center distance when the gear is rotated in contact with a master of known accuracy. Since this variation is the sum of errors in both gear and master, the degree of precision measurable depends on the precision of the master.



The Kodak Conju-Gage Gear Checker automatically records the composite effects of runout, base pitch error, tooth thickness variations, profile error, lead error, and lateral runout. Illustrated is the Kodak Conju-Gage Gear Checker, Model 4U, for gears up to 4⅞" pitch diameter. Larger and smaller models are also available.

Why the Conju-Gage Gear Checker

Kodak Conju-Gage Gear Checkers use a master of exceptional accuracy, the Kodak Conju-Gage Worm Section. These Worm Sections are generated by the continuous action of a thread grinder under control of a precision lead screw—circular pitch error and tooth thickness variations cannot be introduced by defects in an intermittent indexing mechanism. This means a more accurate gaging element, less chance that error in the master may coincide with a tolerable error in the gear to result in a needless rejection. Less chance, too, that an error in the master may subtract from an intolerable error in the gear, passing a gear that will fail in use.

By passing each right gear, rejecting each wrong gear, the Kodak Conju-Gage Gear Checker helps you reduce costs while maintaining highest precision. For the full story of this and other economies achieved by Conju-Gage instrumentation, send for the booklet, "Kodak Conju-Gage Gear Testing Principle." Eastman Kodak Company, Industrial Optical Sales Division, Rochester 4, N. Y.

CONJU-GAGE INSTRUMENTATION

. . . a new way to check gear precision in action

To inspect all kinds of complex parts on a bright screen, Kodak also makes two highly versatile contour projectors.

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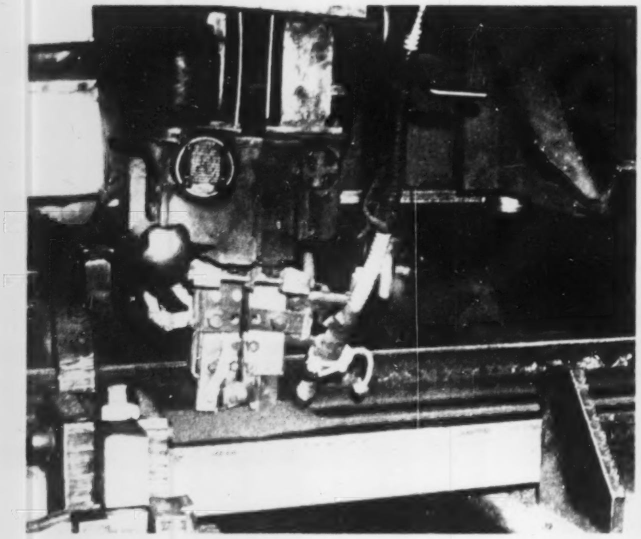


This twin arc welding setup at Pullman-Standard Car is responsible for increased welding speeds

Welding machines at Ryan Aeronautical make a gas-tight seam in stainless cones for GE jet engines

FORUM ON TECHNICAL PROGRESS

Joining and Assembling

New metal-joining methods offer fabricators opportunity to increase output, improve quality and reduce costs. Automatic operations eliminate human variable, require less labor and cut assembly time

MORE and more plants are taking a second look at fabricating costs. With their wage and material prices largely fixed, improved methods and processes are one of the few ways left to hold the line on unit cost. For many, keeping up with the parade of new developments in joining metals means the difference between red and black ink in the ledger.

New developments in welding now being used and others being made ready for the shop promise fabricators renewed opportunity to increase output, improve quality and reduce costs.

Push-Button Welding — Automatic welding was in the spotlight during the past year. At every turn there is evidence of more semi-automatic and automatic operations. While automation does not eliminate the need for skilled labor, machine control of the process does eliminate the human variable which can affect weld quality. Cost advantage comes from increased unit output.

Outlook for 1953 reveals an even greater trend toward push-button welding. Industry is integrating new automatic welding methods into their planning as much as a year or two before actual production use.

Growing Like Topsy—Last year saw unprecedented growth of the inert-gas shielded arc welding processes. Originally developed for welding magnesium, this concept has expanded far beyond its original scope. Whereas it was once limited to a tungsten arc in a shield of monatomic inert gas, today it encompasses, also, an arc with a consumable filler wire in the inert gas atmosphere.

Basic advantages, such as elimination of fluxes, simplified cleaning, higher welding speeds, and the ability to handle hard-to-weld metals with better quality welds, hold for these newer processes as well as for the tungsten arc version. Fundamentally, they allow arc welding of most metals, in all positions, with consistently sound welds.

Inert gas shielded tungsten arc welding is used with the lighter gages of metal, without filler wire. Filler metal is fed into the tungsten arc for welding metals of greater thickness. Besides advantages provided by the tungsten-arc version, which uses the nonconsumable electrode, one of the most important extras is the transfer of metal across the arc with minimum loss of alloying ingredients. Thus, it is possible to preserve virtually intact the composition of the filler wire in the deposited welds.

Versatile—Both of the inert-gas shielded arc processes are capable of welding aluminum, magnesium, chrome-nickel steels, straight chrome steels, nickel, nickel alloys, copper, copper alloys—metals which for so long have created special welding problems.

Inert-gas shielded tungsten arc is proving of value in welding jet engine components. Every conceivable type of metal used in jet engines ranging from plain carbon steel through aluminum clad, low alloy, austenitic stainless, to the high temperature alloys is being welded in production operations.

Deoxidized copper is being welded by the inert gas-shielded arc in cases where welding is used for fabrication. Another field of application, which has grown during the past year, is the production welding of stainless steel tubing of $\frac{1}{2}$ to 3-inch diameter. The shielded arc method is also being used to weld titanium.

New Tool — Inert gas-shielded metal arc welding of carbon and low alloy steel in the flat position is hailed as a new production tool. Potential savings result from the fact that a high operating factor of 50 to 60 per cent is readily obtained, along with higher welding speeds than are possible with flux coated electrode metal arc welding.

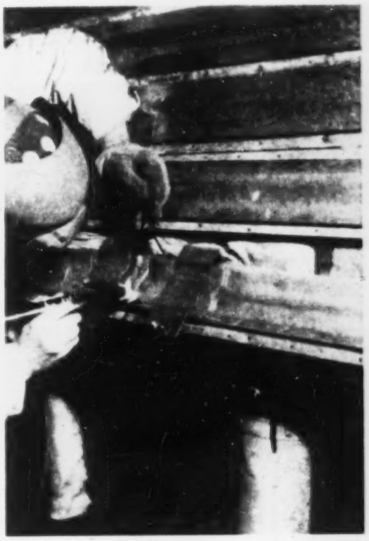
High welding speed combined with peak quality more than doubles production of carbon steel parts such as brackets used to support axle housings for trucks and military vehicles. These were formerly welded with flux-coated electrodes.

Applications are numerous in fabrication of stainless steel and aluminum alloys in thicknesses 3/32-inch and greater for the aircraft industry. Aluminum tubular sections of 0.050-inch wall thickness are being machine welded at 200 inches per minute in production.

Submerged Melt—Speed of submerged melt welding is stepped-up by using multiple electrodes. When two such rods are connected electrically in parallel, fed into the weld at identical speeds, and aligned transversely to the joint, welding speed is increased and the ability to weld poorly fitting joints is improved.

When welding power is distributed over more than one electrode in the same welding zone, control of weld shape and penetration is achieved which would not otherwise be possible. Higher currents and consequently higher welding speeds may be used without producing excessive penetration.

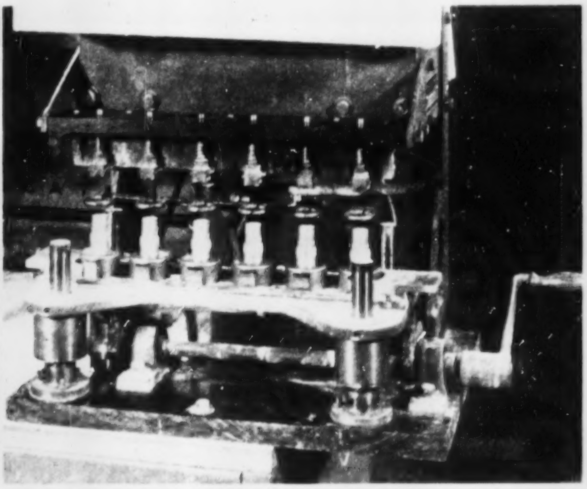
Where joint gap exists, the force of the arcs is directed on the edge of the parts being welded rather than on the gap between them and a wide flat weld is produced without the tendency to undercut or drop-through. Joint gaps up to $\frac{1}{4}$-inch in $\frac{3}{8}$-inch thick steel plate have been successfully welded at speeds in excess of 50 inches per minute.



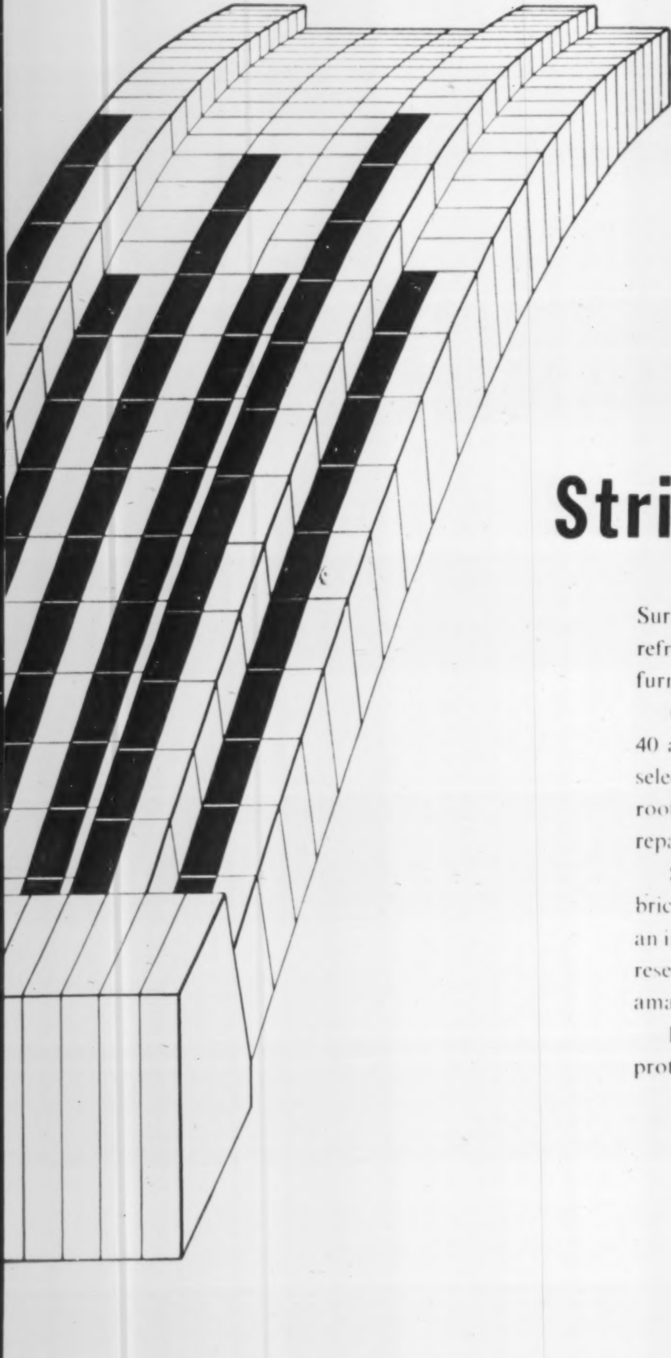
Heliarc is used to butt-weld stainless steel fluted side members of this modern railroad passenger car

Uncomplicated — Simplicity of equipment required and its similarity to existing single electrode apparatus has helped to get this method off to a good start. Standard welding heads are modified for the work by substituting a double feed roll and a twin bore nozzle

Three dollars was saved in assembly of each Stroboscope by using self-retaining Speed Nuts



Brass sleeve is induction brazed to steel case using Handy & Harman wire ring. Time: 31 sec.



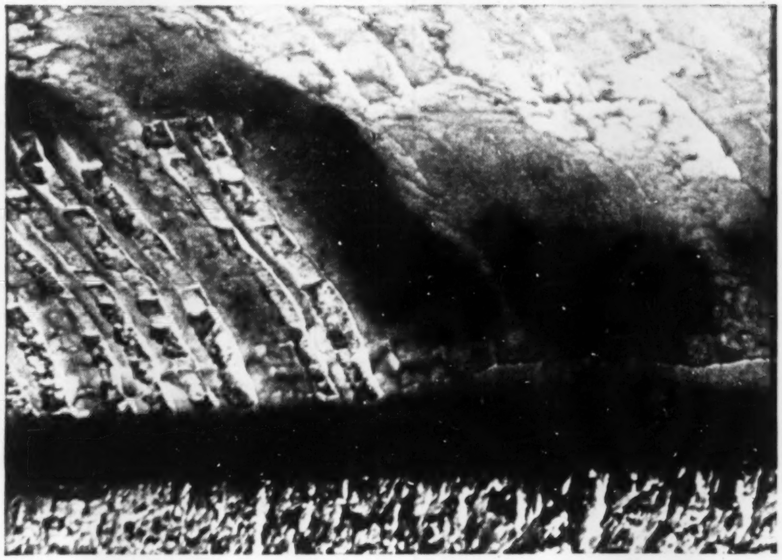
Stripes of Superiority

Survival of the fittest is the rule of the jungle. And so it is with refractories in the critical areas of the nation's open-hearth furnaces.

Convincing proof that Zebra roofs with Grefco's Steelklad-40 are tops in zones of greatest wear, has caused steel men to select Steelklad-40 in more than 9 out of 10 of existing Zebra roofs. Results often show more heats per campaign, reduced repairs—hence greater furnace availability.

Steelklad-40 is a patented unburned chrome-magnesite roof brick that is permanently jacketed in a steel shell which becomes an integral part of the brick itself. Developed in Grefco's modern research laboratories, Steelklad-40 is the major reason for the amazing increase in popularity of the open-hearth Zebra roof.

In service the Steelklad-40 key brick protrude beyond and protect the silica brick from destructive gases. The silica brick



make possible a strong, mechanically stable roof. Note the illustration above. The dark area to the right consists of plain silica construction. The silica brick are ready for a patch. Yet the Zebra section is still in good condition.

Surveys have proved that the Zebra roof has gained industry popularity faster than any other construction in open-hearth history. More and more steel men are calling on Grefco to help solve roof problems with STEELKLAD-40.

Remember, too, Grefco's STEELKLAD basic brick also provide superior service in front and back walls, monkey walls and furnace ends. Whether it's STEELKLAD, fireclay, silica, high alumina or RITEX basic brick . . . mortars, plastics, castables and specialties . . . Grefco serves steel with a truly *complete refractories service*. Call on us!

STEELKLAD
40

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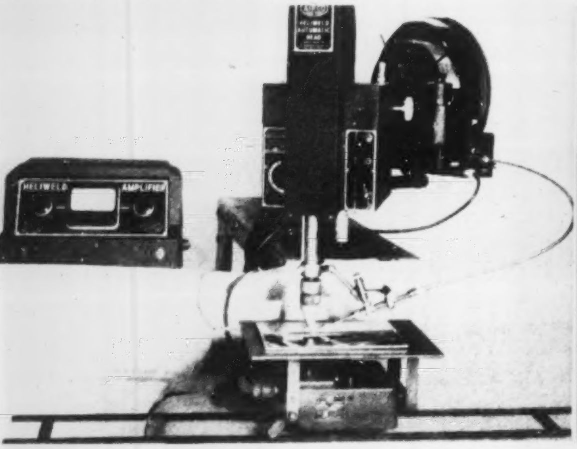
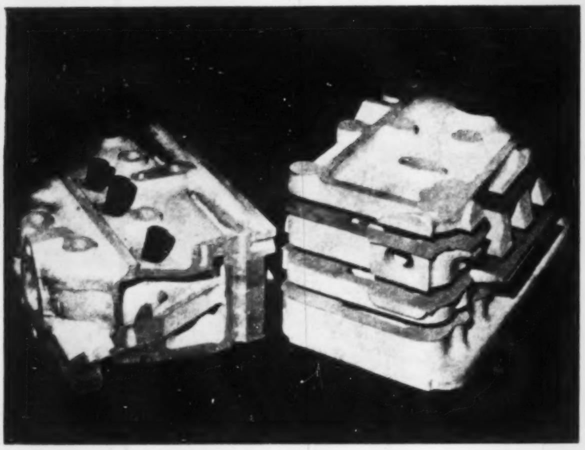


This Heliweld automatic head provides for automatic compensation of arc voltage and arc length. Filler wire on reel is automatically fed to work



Auto cylinder heads and blocks made from separately cast aluminum slices, piled on top of each other, and brazed with a thin brazing sheet between them

for the original single rod equipment.

Handles Titanium—Flash welding continues to be preferred for hard-to-weld materials in many cases. Relatively large production runs of titanium parts are being flash welded. Indications are that it produces the most satisfactory joints of any welding method.

In general, flash welding of titanium results in a more ductile structure than either inert arc or resistance welding because of the forging action and inherent grain refinement. Flash welding can be accomplished by machines which facilitate rapid push-up and burn-off to prevent excessive oxidation.

Plant experience last year indicates that most titanium alloys can be successfully flash welded and yet retain considerable ductility. In the higher alloy materials, it may turn out to be the only feasible method of joining.

Tougher Jobs — Improved spot and seam welding controls were used last year to simplify some of the problems encountered on high resistivity and high hardenability materials. Low-hydrogen electrodes are finding use in welding difficult steels, such as high sulphur, high strength, low alloy, high carbon and free machining steels. Today, they are no longer considered emergency tools. Fabricators use them because they are custom made to match the analysis or heat treating properties of alloy steels.

Progress Here Too—Brazing and soldering highlights were focused on production line assembly.

Across-Flats Dimension (Wrench opening)						
Size	Old Standards				New Standards	
	Cap Screw Auto. Bolt	Regular Bolt	Light Nut	Regular Nut	Bolt	Nut
1/4	7/16	**3/8**	7/16	7/16	7/16	7/16
5/16	1/2	1/2	1/2	**9/16**	1/2	1/2
3/8	9/16	9/16	9/16	**5/8**	9/16	9/16
7/16	5/8	5/8	**5/8**	**3/4**	5/8	11/16
1/2	3/4	3/4	3/4	**13/16**	3/4	3/4
5/8	**7/8**	15/16	15/16	**1**	15/16	15/16
3/4	**1**	1 1/8	**1 1/16**	1 1/8	1 1/8	1 1/8
7/8	**1 1/8**	1 5/16	**1 1/4**	1 5/16	1 5/16	1 5/16
1	**1 5/16**	1 1/2	**1 7/16**	1 1/2	1 1/2	1 1/2
Larger Sizes					Same as Regular Series	

Height of Head or Thickness
New Bolts - Approximately same as Regular bolt.
New Nuts - Same as Light nut in 1/4 - 5/8 sizes;
Same as Regular nut in larger sizes.

Table shows a comparison of the new and old dimensions of light and regular series bolts and nuts. Shaded areas indicate sizes eliminated under new plan. Both fastener user and producer will benefit

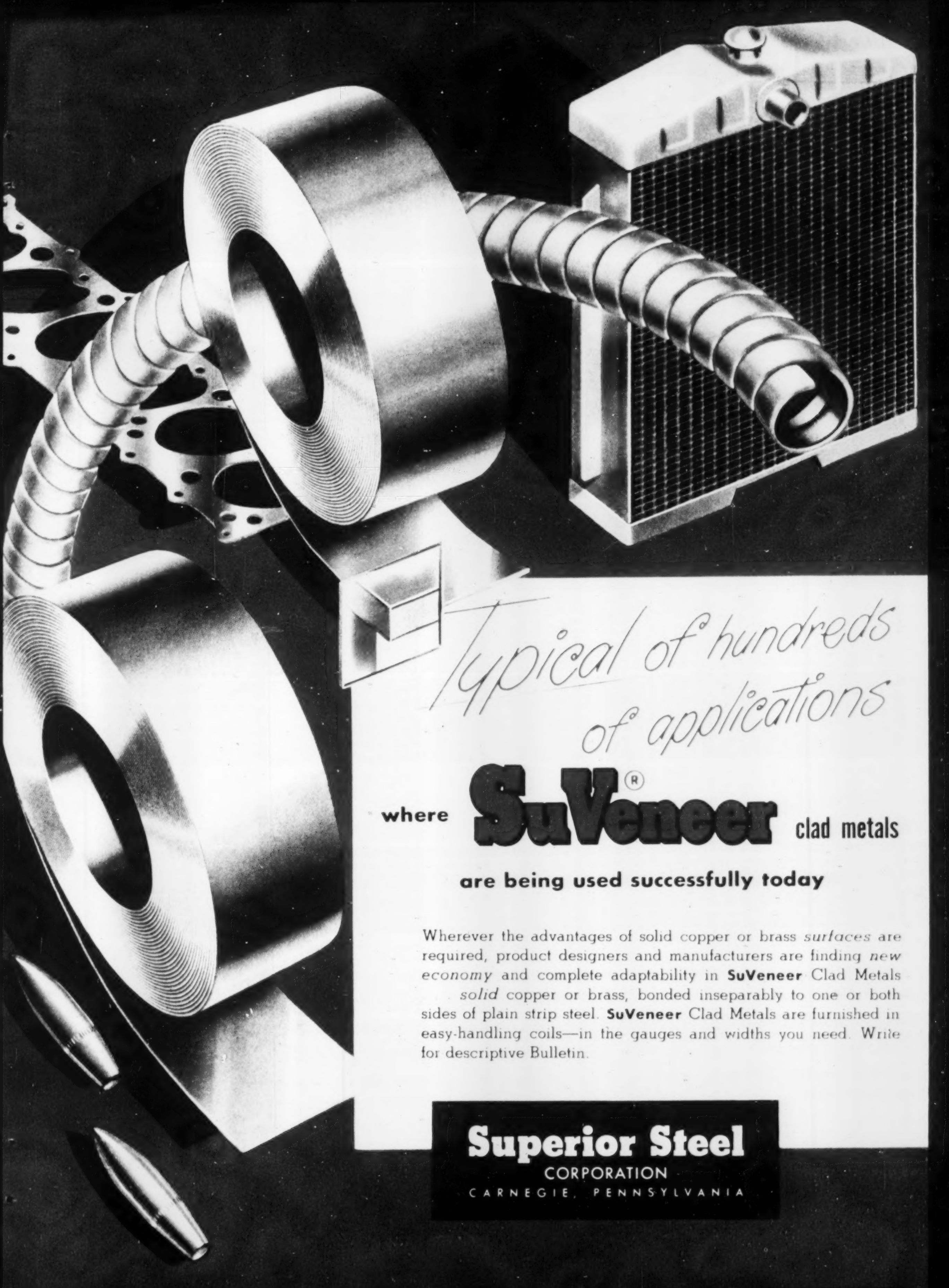
In some plants, parts previously made by adding many hours of machining to solid or semi-formed stock are now produced by induction brazing simpler parts at an overall lower cost. Conventional weldments are being replaced by induction brazing utilizing the wide range of alloys available to meet strength requirements.

For Shells — Induction heating permits brazing operations on parts previously heat treated. Burster tubes and nose adapters on ordnance shells are silver brazed by induction. A completely finished shell has nose adapters brazed in position two at a time on a two station, 15 KW 10,000 cycle machine. The necessary physical strength of the shell, including its fragmentary requirements are not disturbed by this operation.

Developments in protective atmosphere furnaces have done much to widen the application of brazing techniques to practically all metals. Joining of steel assemblies by copper brazing probably has seen widest application during the past year. Low carbon steel parts are fabricated in large quantities by copper brazing in electric furnaces with Exogas atmosphere.

Soft soldering is preferred in some joining work because operation and manipulation are simple. With suitable modifications it may now be applied to nearly all metals and alloys.

Vacuum brazing has been devel-



Typical of hundreds of applications

where **SuVeneer**® clad metals

are being used successfully today

Wherever the advantages of solid copper or brass *surfaces* are required, product designers and manufacturers are finding *new economy* and complete adaptability in **SuVeneer** Clad Metals … *solid* copper or brass, bonded inseparably to one or both sides of plain strip steel. **SuVeneer** Clad Metals are furnished in easy-handling coils—in the gauges and widths you need. Write for descriptive Bulletin.

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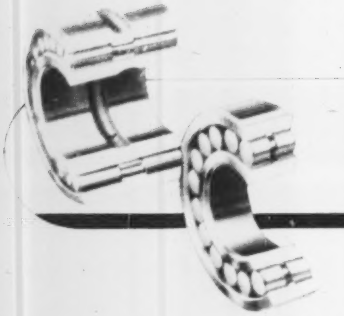
CARNEGIE, PENNSYLVANIA



Over 33% Greater Capacity For The Same Size

There is a challenge facing manufacturers today to build smaller and more compact machines with extra precision and to combine more operations in each machine. This makes the selection of the proper bearings extremely important. A definite plus factor in this selection is the availability of a precision bearing that will deliver extra load carrying capacity in a minimum amount of space.

Obviously roller bearings, and particularly those of the small (needle) roller type occupy far less bearing space for equivalent capacity than ball bearings. Roller bearing capacity is built up in proportion to the effective race and roller contact provided. Thus a full-type roller bearing *without space wasting cages* should provide the greatest capacity of any type of anti-friction bearing. However, to offer a perfect bearing the resulting full roller complement must be prevented from skewing and binding where misalignment occurs in the application.

The Guiderol bearing is the accepted answer to all these requirements considering precision, load capacity, long life, versatility of mounting, and ease of lubrication. Published ratings show the Guiderol CT Series bearing has over 33% greater load carrying capacity than the average of the four highest rated interchangeable bearings. As a result, a Guiderol bearing at least one size smaller can often be substituted with the necessary shaft and housing requirements reduced in size and cost.

Bearing	McGill Guiderol No. GRI 209	Brand A Bearing	Brand B Bearing	Brand C Bearing	Brand D Bearing
Published Load Rating	8370 lbs.	6700 lbs.	7000 lbs.	5520 lbs.	6080 lbs.

Capacities at 2500 hours average life at 100 RPM

How Rollers Are Guided

In the Guiderol bearing design the grooved rollers with full race width contact are prevented from skewing by a center guide rail. Normally the rollers run on a true axis not contacting the rail and thus need no correcting. (Fig. 1) Should misalignment cause a shift off center (Fig. 2) the leading end of the roller is retarded by contact with the rail at location Y. The trailing end catches up, relieving the rail contact, and the roller then resumes normal operation.

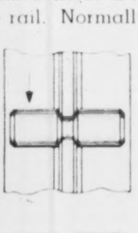


Fig. 1

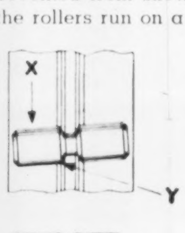
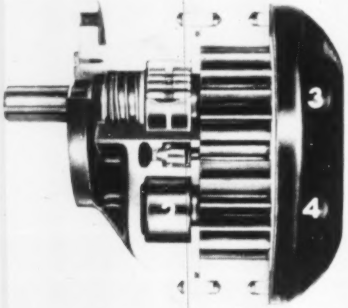
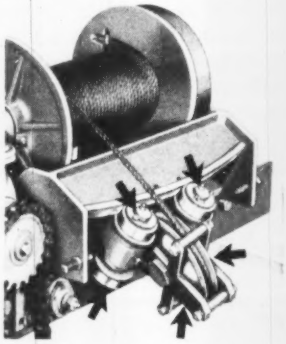


Fig. 2

Typical GUIDEROL® Bearing Mountings

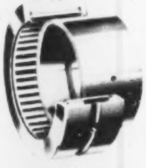


On a Hydreco Gear Pump Idler and Drive Shaft, 4 Guiderol bearings are used. The longer rollers of the Guiderol bearings are effective virtually to the edge of the races. This gives substantial support close to the gear and materially reduces shaft deflection.

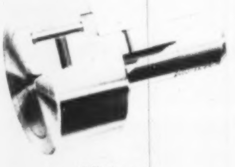


Four Guiderol bearings support and guide an automatic spooling attachment across the face of the reel track on a 20,000 pound Gar Wood Reel-Lite Winch. The guided roller principle prevents skewing of rollers in the 4 vertically mounted bearings even with a 10,000 pound angular load per bearing. A fifth Guiderol bearing in the sheave provides added stability and eliminates binding due to off-center loading.

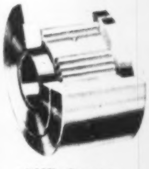
MULTIROL® Bearings



SE Series



CF Series



CYR Series

A new 140-page Bearing Reference Guide complete with 30 pages of vital engineering data has just been released by the McGill Manufacturing Company.

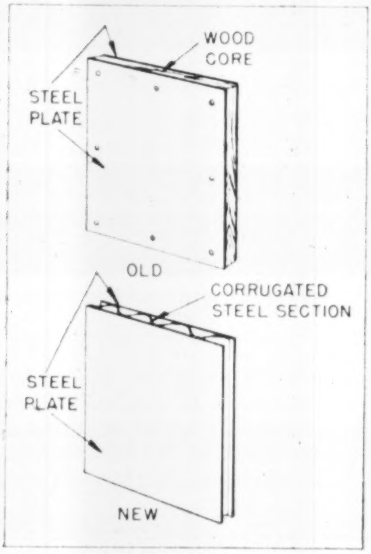
It has the full story on the advantages of Guiderol Bearings and in addition contains complete information on the well-known Multirol CF, CYR and SE Bearings. *Send now for your copy of the McGill Catalog No. 52.*

McGILL® — Precision Bearings

McGILL MANUFACTURING COMPANY, INC.
301 N. Lafayette Street, Valparaiso, Indiana

oped to produce high strength bonds between corrosion resistant alloys and low and medium carbon steels.

Paste Compounds — Extrudable paste compounds have advanced copper brazing as a joining process. In some companies, 70 per cent of the joining metal comes from such a source. A large inventory of stock brazing forms is eliminated. Man-hours in the application of the brazing media are reduced by the use of semiautomatic applicators.



Diesel locomotive side panels are made by sandwiching a corrugated steel core between two light gage steel sheets and using a 3M adhesive

New Twist — A recent development is an iron-containing copper brazing paste. Formerly line to line or slight press fits were required but with new iron-containing copper brazing material, assembly gaps of up to 0.005-inch can be successfully bridged and high joint strength maintained. This brazing paste permits joining loose fit stamped parts and speed-up ordinary assembly by allowing hand push joining rather than mechanical or hydraulic press assembly.

Copper brazing of stainless steel parts with pastes is now well established utilizing retorts for special dry atmospheres or furnaces designed to assure almost absolutely dry atmosphere gas.

IF THIS IS YOUR PROBLEM

TRACER TURNING TOUGH ON TOOLS?

These tools will solve it!

Tracer turning has this great advantage—higher production rates can be attained, using far less skilled operators' time than is required for the conventional "cut and try" procedure.

But—any tracer lathe is only as good as the cutting tool it drives. The burden on the tool is great. It must have ruggedness for heavy stock removal and a long-lasting cutting edge able to maintain accurate duplication throughout the complete machining cycle.

Kennametal pioneered this field—has developed carbide tooling for light and heavy tracer lathe jobs, including roll profiling. With this tooling, tracer turning has reduced machining time as much as 80%*.

Our engineers will cooperate with you—give you the benefit of their industry-wide experience—develop the most suitable Kennametal tooling for your tracer operation. Write, telling us your problem. Kennametal, Inc., Latrobe, Pa.

*Performance studies will be sent upon request.

KENNAMETAL CLAMPED PROFILING TOOL

KENNAMETAL BRAZED PROFILING TOOL

KENNAMETAL HEAVY DUTY TRACER TOOL

KENNAMETAL
CEMENTED CARBIDE TOOLING THAT INCREASES PRODUCTIVITY
®

CLEVELAND *Top Quality* FASTENERS

Cap Screws: All standard heads—Hexagon (bright and high carbon heat treated)—Flat—Fillister—Socket (plain and knurled and flat heads)—Special. Extra large sizes—extra and special lengths—special materials.

Also larger than usually listed hex head and flat head cap screws.

Set Screws: Square Head Cup Point in an unusually wide range of sizes. Other points available.

Milled Studs: All standard sizes through 1¼" diameter. Also special sizes and threads.

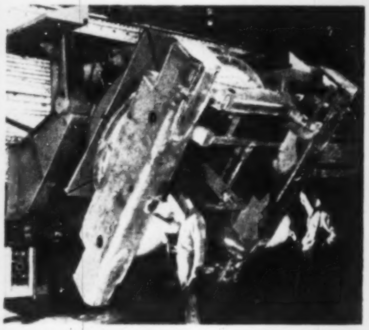
Your own design parts—cold headed or single or double extruded, accurate as to dimensional detail, heat treated as required. Send blue prints and specifications to our factory.

CLEVELAND *Top Quality* FASTENERS

THE CLEVELAND CAP SCREW COMPANY
2935 East 79th Street, Cleveland 4, Ohio
Warehouses: Chicago • Philadelphia • New York • Providence
originators of the Kaufman DOUBLE EXTRUSION Process
Ask your jobber for Cleveland Fasteners

JOINING AND ASSEMBLING

Trick Construction—At the moment, a new brazing process makes aluminum cylinder blocks, heads and crankcases important in possible automotive applications. The trick lies in a sandwich type of construction. Three or four sections are cast separately and then piled on top of each other with a thin brazing sheet between them.



P&H electrode is used for welding section on this excavator body

When put into a high temperature furnace, the brazing sheet which melts at a lower temperature than the separate cast pieces makes a one piece cylinder head or block. The process eliminates intricate core work and expensive machining.

Fasteners Grow — Requirements are growing for special fasteners to lower assembly costs, improve strength and appearance, and fill special needs. Included in the latter group are high temperature requirements by the military.

Field of special fasteners saw wide acceptance of shooting fasteners, double hex head bolts and nuts, plug nuts, weld nuts, cage nuts, and weld bolts. Also, in the lime light are new designs for Marsden nuts and place bolts, new lock screws and lock nuts.

Last year saw a general speed up in industry adoption of new unified standards for treads and fastener designs. American - British - Canadian meetings in June laid groundwork for extension of product unification to include materials, dimensions, and design elements of standard fasteners. Cap screws were further improved by agreement on angularity or runout con-

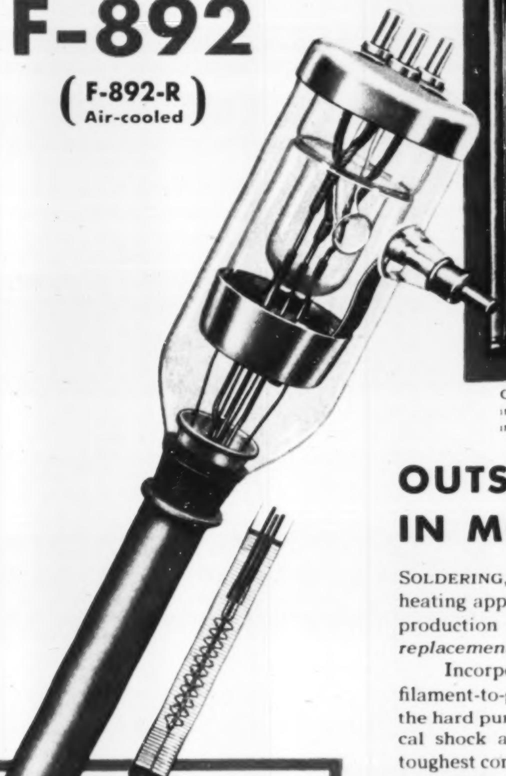
Here's the new-design tube that gives

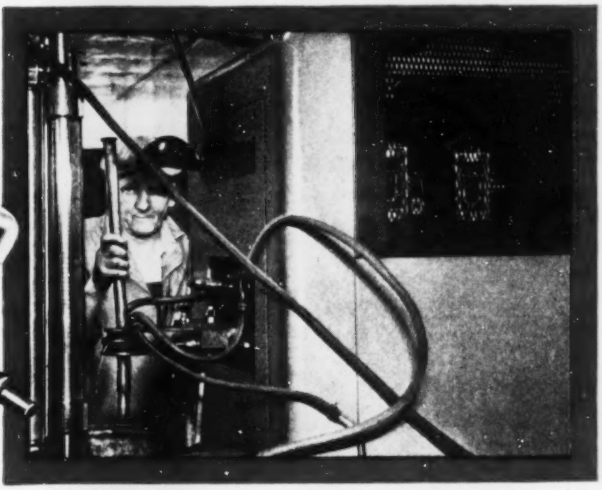
INDUCTION HEATING EQUIPMENT "PLUS-ENDURANCE"

For Today's Rugged Production Pace in the Metal Working Industry...

Federal's F-892

(F-892-R Air-cooled)





Case hardening of tractor shoe pins by Industrial Electronic Engineering Corp., Milwaukee, Wis., using 20 KW Allis-Chalmers induction heating unit equipped with Federal's rugged and reliable F-892 power triode.

OUTSTANDINGLY DEPENDABLE IN MOMENTARY OVERLOADS

SOLDERING, brazing, annealing, surface hardening . . . whatever your induction heating application . . . Federal's re-designed F-892 power triode really keeps production lines rolling . . . *by reducing time-wasting shut-downs for tube replacements!*

Incorporating Federal's new *Double Helical Filament* (which eliminates filament-to-grid shorts) the F-892 has been especially designed to withstand the hard punishment of sudden and extreme load changes . . . to resist mechanical shock and steady vibration . . . to stay on the job *longer* . . . under the toughest conditions.

Back up *your* induction heaters with the ruggedness and *plus*-endurance of Federal's F-892. Its proved-design assures you the highest operating efficiency for 10 and 20 KW equipments . . . with *lower* tube costs through *longer* life and *fewer* replacements!

Write for data on Federal's line of tube types for use in induction heating equipment. Address Dept. L-1132.

First with the new proved-design

DOUBLE HELICAL FILAMENT

- Does away with bowing
- Eliminates filament-to-grid shorts
- Greatly increases tube life

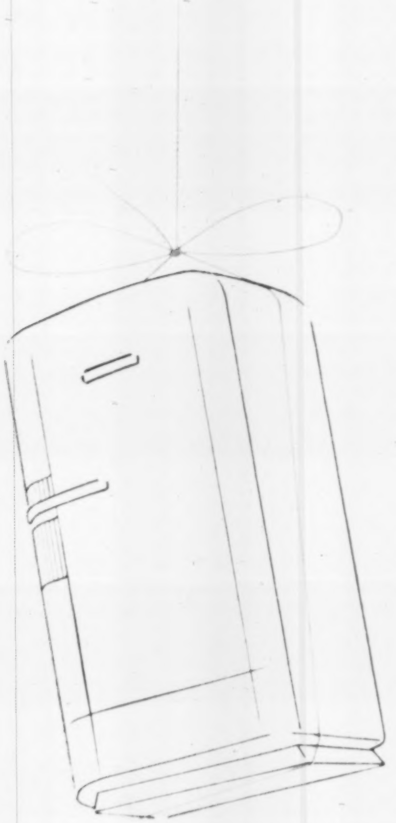
"Federal always has made better tubes"

Federal

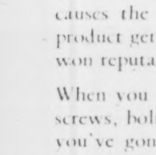
Telephone and Radio Corporation

VACUUM TUBE DIVISION 100 KINGSLAND ROAD, CLIFTON, NEW JERSEY

In Canada: Federal Electric Manufacturing Company, Ltd., Montreal, P. Q.
Export Distributors: International Standard Electric Corp., 67 Broad St., N. Y.



When reputation hangs "by a thread"



the *source* of your threaded fasteners becomes vastly important

It's unlikely that any customer will ever know or care where you get the screws, bolts and nuts that hold your product together. But if just one of those threaded fasteners fails to hold properly and causes the customer serious inconvenience, your product gets the blame. To that extent, your hard-won reputation literally hangs "by a thread."

When you look to Pheoll for your every need in screws, bolts, nuts and special threaded fasteners, you've gone all the way toward making sure of *uniform, high quality*. Pheoll's half century of experience, constant research and rigid product inspection assure this. And with Pheoll Quality, you now get these PLUS services!

First, new, efficient procedures for production scheduling and order control that add up to "delivery promises that count." ***Second,*** truly modern facilities so extensive they'll easily meet your toughest schedule demands or volume requirements. ***Third,*** cost saving design and engineering assistance to simplify your fastener problems. ***Fourth,*** experts in special products, and producers of the most complete standard product line in the screw industry. ***Fifth,*** continuously large inventories of both finished goods and raw materials assure prompt deliveries of your requirements.

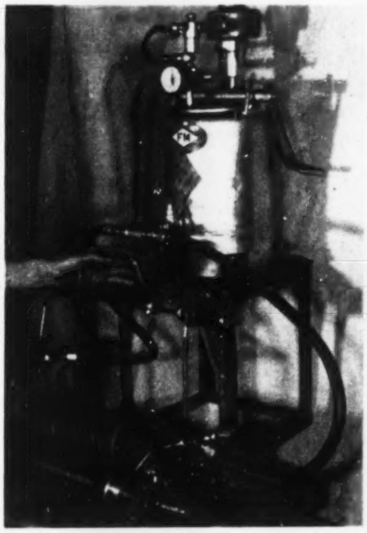
The full facts are so remarkable they've been put into a booklet titled, "Pioneering in Customer Service." May we send it to you?

PHEOLL
MANUFACTURING COMPANY
5700 ROOSEVELT ROAD, CHICAGO 50, ILL.

SCREWS
BOLTS
NUTS

trol. Artificial difficulties in producing screws to meet a variety of Not-Go (Lo-Limit) gages may be removed by adopting one type gage as umpire. This affects all production of externally threaded products.

Consolidation, Too—Standardization of square and hexagonal bolts and nuts received final approval by the American Standards Association, designated as B18.2-1952. Important change is that, with exception of heavy bolts, head dimensions of all series of hexagonal bolts and cap screws are consolidated.



Glidden Cubond brazing paste being applied to rifle shell body. Paste is extruded to form a ring at ends

Recent tendencies toward larger diameters and higher strength screws proved that the cap screws in the higher ranges had too small a head. These cap screws ⅝-inch and over are now identical to the bolts in that range. New standard is also used for nuts. (see table)

New Bolt Material—Aluminum bronze properly processed and of the iron bearing single phase type looks good as a new bolting material. For applications concerned with just tensile strength, a single phase or duplex alloy can be used. When the application requires toughness together with strength, single phase materials are by far

Sure Fire Killer!

"Automatic" SPRAY Sprinkler

UL LISTED AND FM APPROVED

YOU should specify "Automatic" SPRAY Sprinklers for your new building now in the planning stage or an old one, soon to be renovated. For here is a completely new fire fighting device that provides far superior protection than can conventional approved sprinklers. They're recognized as **preferred** for installation in all types of occupancies . . . both concealed and exposed piping systems. Yet, "Automatic" SPRAY Sprinklers cost no more than old style heads.

Ask any fire insurance underwriter about "Automatic" SPRAY Sprinklers, the "sure fire killer." He knows the facts of fire and what's needed for maximum safety.

You can afford no less than the best. Get "Automatic" Sprinkler . . . . FIRST IN FIRE PROTECTION.

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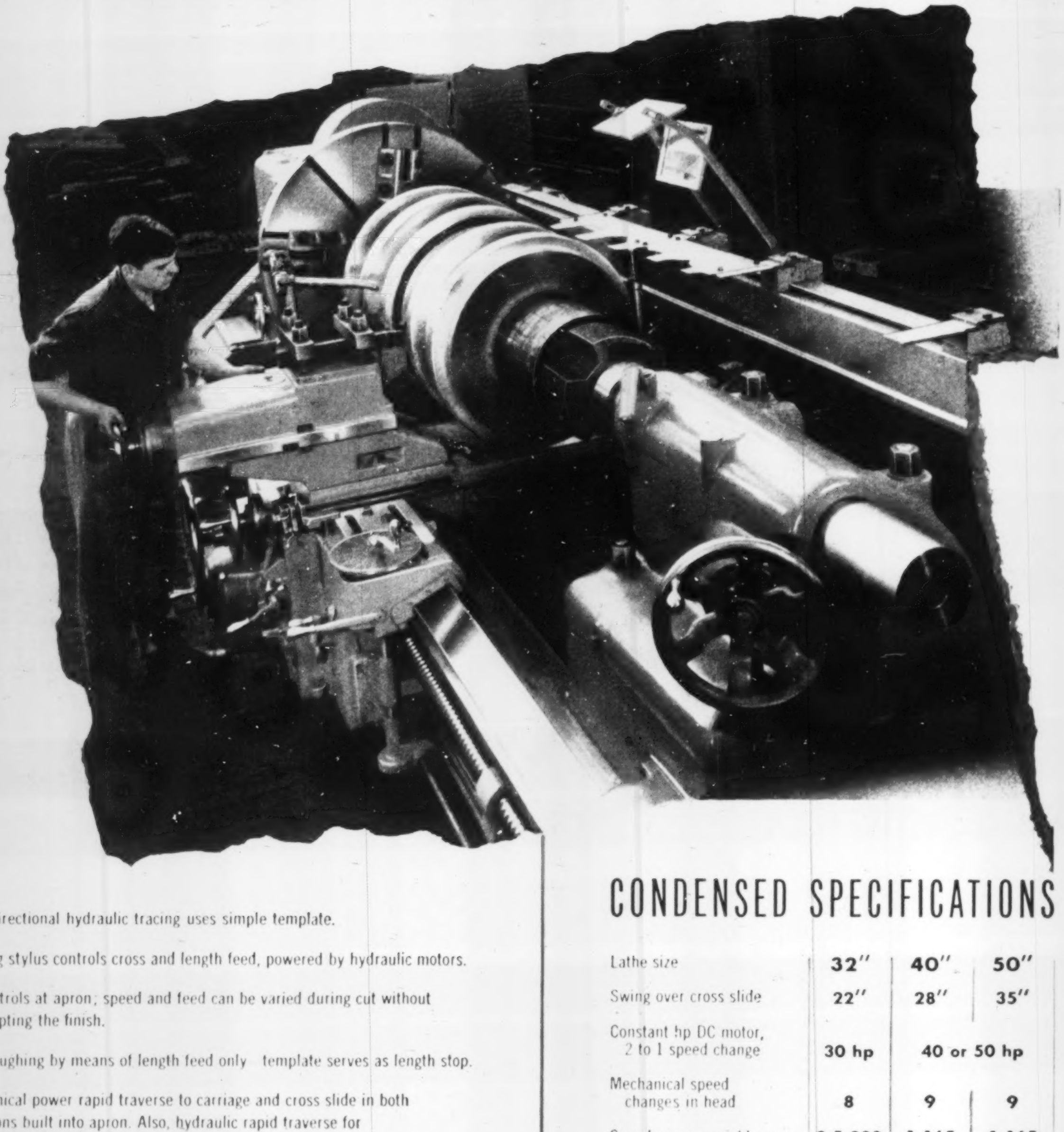
Coming Soon...

A DEMONSTRATION: LEBLOND



Two directional hydraulic tracing uses simple template.

Tracing stylus controls cross and length feed, powered by hydraulic motors.

All controls at apron; speed and feed can be varied during cut without interrupting the finish.

Fast roughing by means of length feed only — template serves as length stop.

Mechanical power rapid traverse to carriage and cross slide in both directions built into apron. Also, hydraulic rapid traverse for retracting cross slide when under tracer control.

Standard feeds and threads available through quick change box—hydraulic motors disconnected through fool proof interlock.

USERS REPORT SAVINGS OF MORE THAN 75%.

CONDENSED SPECIFICATIONS

Lathe size	**32″**	**40″**	**50″**
Swing over cross slide	**22″**	**28″**	**35″**
Constant hp DC motor, 2 to 1 speed change	**30 hp**	**40 or 50 hp**	
Mechanical speed changes in head	**8**	**9**	**9**
Speed range, variable, rpm	**2.5-230**	**1-165**	**1-165**
Hydraulic Feed	**VARIABLE**		

Single speed AC drive also available.

WRITE FOR COMPLETE INFORMATION

ROLL-CONTOURING LATHE

See it in operation at the LeBlond Plant

JANUARY 26-30

You are cordially invited

to attend the demonstration of a
LeBlond 40" Roll Contouring Lathe
at our plant in Cincinnati
during the week, January 26-30

B. N. Brockman
VICE PRESIDENT

*R.S.V.P.**

THE R. K. LEBLOND MACHINE TOOL COMPANY, CINCINNATI 8, OHIO

* Please tell us which day you'd like to come. We'll confirm.

turned faster by LeBLOND *of Cincinnati*

WORLD'S LARGEST BUILDER OF A COMPLETE LINE OF LATHES • *FOR MORE THAN 65 YEARS*

do your
Ductility Testing
quick & easy

The turning of a single hydraulic control knob clamps the specimen, tests it, then releases it. The test is made in plain view, and the maximum pressure indicators show the result until reset. This highly sensitive sheet metal tester will take up to 3/16" thick specimens and exert up to 30,000 pounds pressure, at any desired rate of speed. Hydraulic mechanism is all neatly enclosed. Write for catalog sheet and prices.

DETROIT TESTING MACHINE COMPANY

9390 Grinnell Ave., Detroit 13, Mich.

Group of RUEMELIN Fume Collectors Keeps Shop Clear of Welding Fumes

This well ventilated welding department is typical of hundreds of similar installations. Welding operators appreciate smoke and gas-free atmosphere. Thousands in service. Many repeat orders. Collecting fumes at the source with local exhaust hoods has proven most practical in operation. It is particularly helpful in winter months when doors and windows are closed. Write for Bulletin 37-D describing all types of Ruemelin Fume Collectors.

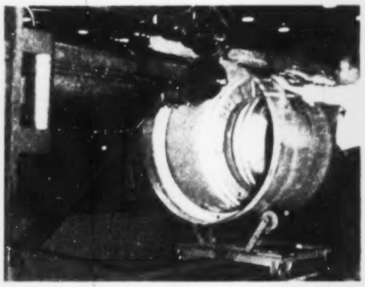
RUEMELIN MFG. CO.
MFRS. & ENGRS. • SAND BLAST & DUST COLLECTING EQUIPMENT
3882 NORTH PALMER STREET • MILWAUKEE 12, WISCONSIN, U. S. A.

A 5011-½ R2

the best. The reason for this is that all alpha materials in the copper base alloys possess the toughest characteristics when processed properly.

The all alpha iron bearing aluminum bronze alloy having approximately 7 per cent aluminum, 2.2 per cent iron, balance copper, shows good resistance to sea water, some acids, and alkalies.

Rivet Activity—Producers of industrial rivets are fostering an educational program to have users consider multiple upset forgings, produced either by the hot or cold process, to substitute for parts that have heretofore been made on automatic screw machines. This will result in considerable saving of raw material, especially where raw material is of the high priced variety such as stainless steel and nickel.



This Federal seamwelding machine is used to fabricate large aircraft fuel tanks with both speed and accuracy

Hold Tight—Adhesives are gaining ground in the fabricating field. A new synthetic rubber adhesive is being used in the fabrication of light weight steel panels by a manufacturer of diesel locomotives. Method has paid dividends in lower production costs, stronger construction and superior performance.

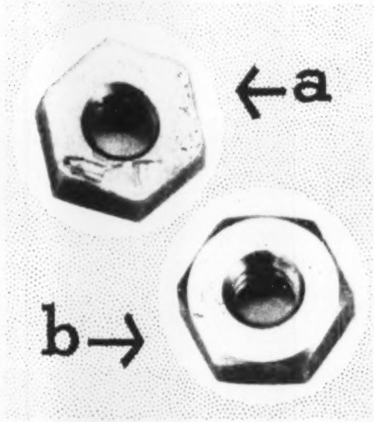
Side panels on the diesel locomotive are now made by sandwiching a corrugated steel core between two light gage steel sheets. The lamination is made in a single operation by joining the sheet steel with an adhesive. The assembled panels, up to 3 by 6 feet in size, are bonded under heat and pressure.

Adhesive bonding proved supe-

FASTENER COMPARISON

Steel Readers

Asked to Compare Difference Between Punched and Turned Nuts



Comparison of Unretouched Photos

Note the visual differences between Photo A, an ordinary punched nut and Photo B, a turned nut made by the Fischer Special Mfg. Co. Which one would you prefer to use on your products? Now, consider this fact . . .

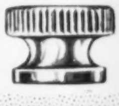
The Difference is PRECISION . . . NOT PRICE!

By dealing direct with the Fischer Special Manufacturing Co., or one of its factory sales representatives, you can buy precision-made turned nuts for the same price as common punched nuts.

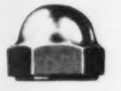
Factory Representatives

Any Fischer representative will give you full information. Listings are located in file 4K/Fi in Sweet's Product Design File for '53, the '53 Product Engineering handbook, page G28 and in the Free 16 page Fischer File.

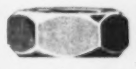
BASIC STYLES ALWAYS AVAILABLE



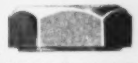
KNURLED BRASS THUMB NUTS



HEXAGON BRASS CAP & OPEN-END CAP NUTS



HEXAGON BRASS MACHINE SCREW NUTS
Single and Double Chamfered



AMERICAN STANDARD HEXAGON BRASS NUTS
Full and Jam

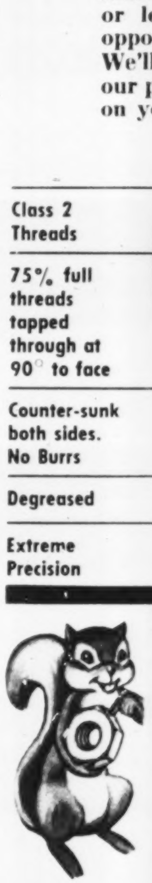
"Fischer Turned" BRASS NUTS

cost the same or less than ordinary punched nuts

Good news for cost-conscious design, engineering and purchasing executives. Now! You can get all the product-improving, cost reducing features of precision made "Fischer Turned" Brass Nuts for the same price or less than common punched nuts. Here is your opportunity to build a better product at lower cost. We'll be glad to prove our precision with samples, and our prices with quotations. Send the Coupon or request on your letterhead.

✓ Check these Features

Class 2 Threads	Galling and seizing in high-cycle wrenching eliminated.
75% full threads tapped through at 90° to face	For extra strength and full purchase of nut seat.
Counter-sunk both sides. No Burrs	For quicker assembly and protection of threads on both sides.
Degreased	Clean, ready for use!
Extreme Precision	Meets or exceeds AN 340, 341, 345 specifications.



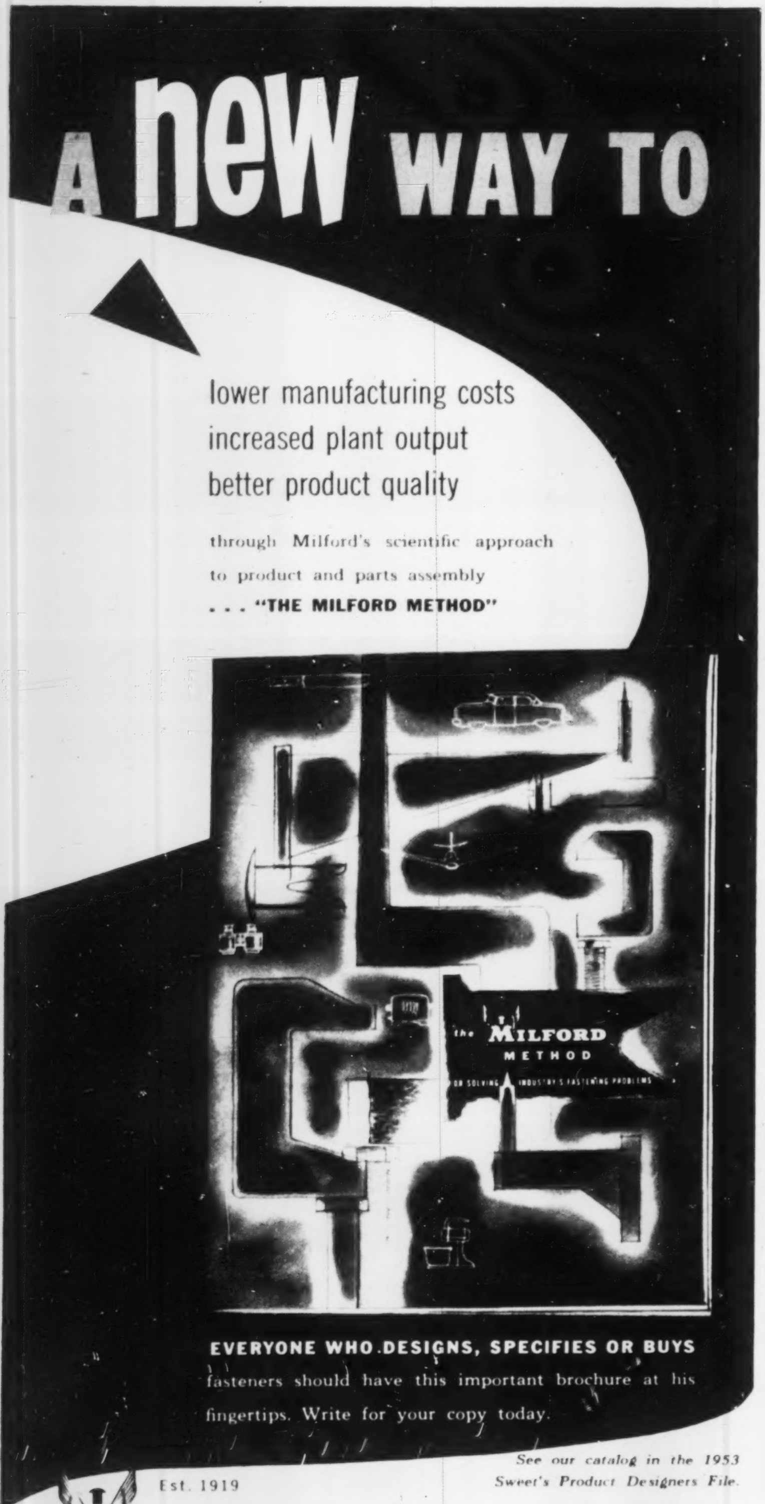
MAIL NOW FOR FULL INFO

FISCHER SPECIAL MFG. CO.
446 Morgan St., Cincinnati 6, Ohio
Tel. WOodburn 1280

SR

Please send samples of nuts in these sizes and prices based on quantity of

NAME
ADDRESS
CITY ZONE STATE
TITLE


A new WAY TO

lower manufacturing costs
increased plant output
better product quality

through Milford's scientific approach
to product and parts assembly
. . . "THE MILFORD METHOD"

the MILFORD METHOD
FOR SOLVING INDUSTRY'S FASTENING PROBLEMS

EVERYONE WHO DESIGNS, SPECIFIES OR BUYS fasteners should have this important brochure at his fingertips. Write for your copy today.

See our catalog in the 1953 Sweet's Product Designers File.

Est. 1919

the MILFORD RIVET & MACHINE CO.

MILFORD . . . *the name to rivet in your memory for fasteners*

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1160 W. RIVER ST. ELYRIA OHIO
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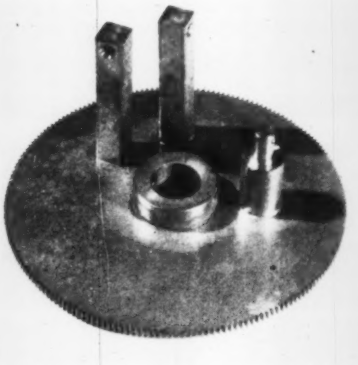
757 S. PALM AVE. ALHAMBRA, CALIF

rior to other assembly methods. Rivets vibrated loose; spot welding localized stress and destroyed outward appparance. Tests showed that a lamination made with the rubber adhesive is nine times as durable as a rigid bond of the same type.

Magnesium Sticks — Adhesive bonded joints are used in magnesium fabrication on aircraft production lines. Fatigue life of adhesive bonded joints is high. The continuous bond results in less stress concentration. If dissimilar metals are joined to magnesium, adhesive prevents galvanic corrosion.


All four of these carbon steel joints were copper brazed in one operation in Exogas atmosphere furnace

Metal adhesives are applied as a liquid adhesive, or as a tape between the surfaces. Heat and pressure cures adhesive to a high strength bond. Some adhesives set at room temperature but highest properties are obtained by curing.

No Heat Needed—Cold welding, the designation applied to joining metals without heat, gained ground during the year. Principle involved is that of metal flow at the joint and severe deformation must occur for good welds. The process has been applied to aluminum, copper, silver, and some of the other more ductile metals.

Striking results are obtained in the case of aluminum where studs can be welded to flat plates. Aluminum wire is also joined by the method. Both applications are difficult by the everyday methods of joining, such as brazing or resist-

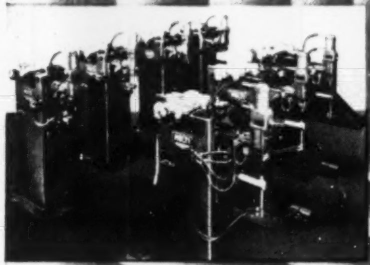
RESISTANCE WELDING EQUIPMENT

designed to meet production welding requirements with quality and economy in high-speed output!

by

MULTI HYDROMATIC

PRODUCERS OF ADVANCEMENT IN
RESISTANCE WELDING EQUIPMENT

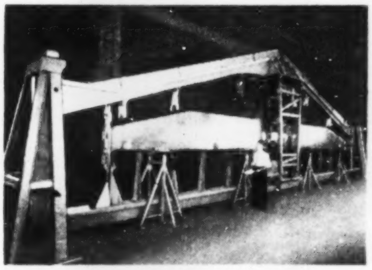


STANDARD WELDING EQUIPMENT — Air, hydraulically and mechanically operated. Press type, rocker arm pedestal type, seam, butt, upsetting and projection welders.

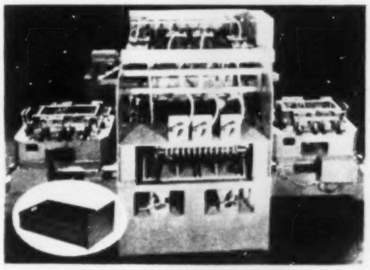
WELDING MACHINE — Designed for welding of oil pans. Production — 400 units per hour. Equipped with 100 K. V. A. transformer and 30 single acting welding guns.

● Whatever the needs of your operation may be . . . mass production, fully automatic multiple-spot installations, or single-spot hand applications . . . standard, or special . . . Multi-Hydromatic offers the equipment that will meet those requirements.

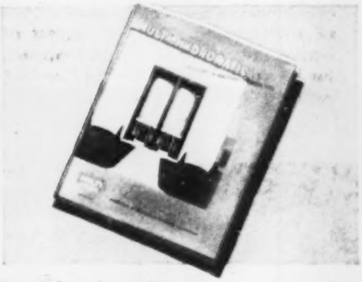
The recognized superiority of our equipment is based on the broad experience of our organization — a background of years in processing, engineering and building all types of resistance welding equipment, tools, jigs and fixtures.



ASSEMBLY FIXTURE — Designed for production of aircraft components at a high production rate, with positive accuracy.



MULTIPLE SPOT WELDER — This machine welds six different types of steel drawers.

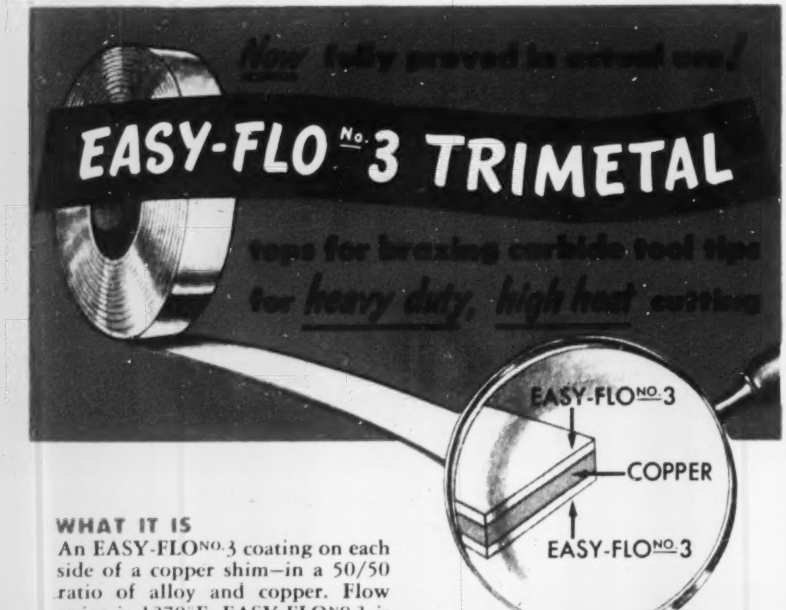


Send for this informative Multi-Hydromatic catalog today! See the broad possibilities in the application of resistance welding equipment.

MULTI HYDROMATIC

PRODUCERS OF ADVANCEMENT IN
RESISTANCE WELDING EQUIPMENT

THE *Multi-Hydromatic*
WELDING AND MANUFACTURING CO.
23171 GROESBECK HIGHWAY • EAST DETROIT, MICHIGAN


Now fully proved in actual use!
EASY-FLO No. 3 TRIMETAL
tops for brazing carbide tool tips for heavy duty, high heat cutting
EASY-FLO NO. 3
COPPER
EASY-FLO NO. 3

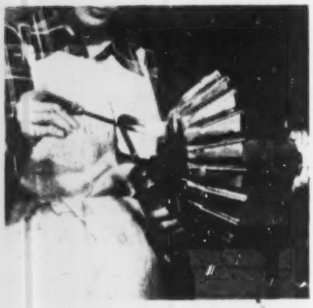
WHAT IT IS
An EASY-FLO NO. 3 coating on each side of a copper shim—in a 50/50 ratio of alloy and copper. Flow point is 1270°F. EASY-FLO NO. 3 is the silver brazing alloy, long a favorite for mounting cemented carbide tips and recommended by leading tip manufacturers.

WHAT IT'S FOR
It's the fast, easy, low-cost way to mount cemented carbides for applications calling for a "sandwich" type braze such as big lathe, planer and shaper tools, milling and form cutters, broaches, etc. Preplacing the alloy and copper all in one piece instead of three, saves a lot of time and labor.

WHY IT EXCELS
The EASY-FLO NO. 3 makes its usual high strength joints while the copper acts as a shock absorber. The combination assures joints capable of withstanding the big stresses of heavy duty cutting—amply proved on actual rock drill bits and on big milling cutters as shown at left.

FORMS AVAILABLE
STRIP from 1/4" to 2" wide, and SHEET from 2" to 4". Overall thicknesses of .010", .015" and .020" and heavier. Also in precut shims to fit standard carbide tip sizes.

WHERE YOU CAN GET IT
From any Handy & Harman distributor. There's one near you. If you can't locate him, write for our "Distributor List."



Mounting carbide tips is a cinch when you use EASY-FLO NO. 3 TRIMETAL. After cleaning tips and tool surfaces, use a precut shim, or cut shims to fit, preplace them and heat. Anybody can be readily trained to do it. Illustrations show work of this kind being done at the Modern Corporation, Detroit, Michigan.

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ORIGINATORS OF EASY-FLO & SIL-FOS

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ance welding. Most of the work being done on cold welding, however, is still of an experimental nature.

Old Stand-by—New uses for resistance welding cannot be overlooked. Cost-saving applications come to the front every year. Advantages of resistance welding are too frequently bypassed because at first glance some products do not seem to lend themselves to the process.

In some cases design changes are made to adapt parts for fabrication by the process. A manufacturer of refrigerator frames is a case in point. Designing them for projection welding increased production 260 per cent. In other cases reductions in cost of 50 to 75 per cent are not unusual.

Choose Right Machine—Key to maximum cost reduction is getting the right machine to do the job. For ordinary joining operations there are a variety of stock machines available. These are usually versatile welders that can be used to perform a wide variety of jobs. Usually, most impressive production gains and cost reductions are obtained with specially designed equipment.

Such machines cost more than stock models. In addition, they are designed to perform a specific operation. Experience on the long pull has been that production gains more than offset these disadvantages and they pay for themselves in a short time.

Auto industry has been especially adept in putting combination welding machines to work. These perform several operations, automatically. In some instances jobs performed are progressive welding operations, while in others welding and forming are combined. Machines of the latter type form and weld fender cones, steel drums and rectangular boxes.

Automatic feeding devices moved to the front during the year. Hopper feeding is especially well-suited to spot or projection welding of small pieces at high rates of speed. Pieces are fed from several hoppers to a cam-operated fixture where they are positioned and welded automatically.

Here at Sterling Bolt Co., a single, integrated DEPENDABLE source can supply you with more than **200,000** stock and standard sizes in Bolts, Nuts, Screws and Washers for your specific needs.

For more than 35 years Sterling Bolt has been a prime supplier of metal fastenings to America's best-known companies—because Sterling facilities combine both warehouse and mill, giving you advantages of **PROMPT SERVICE** and **COMPETITIVE DISCOUNTS**.

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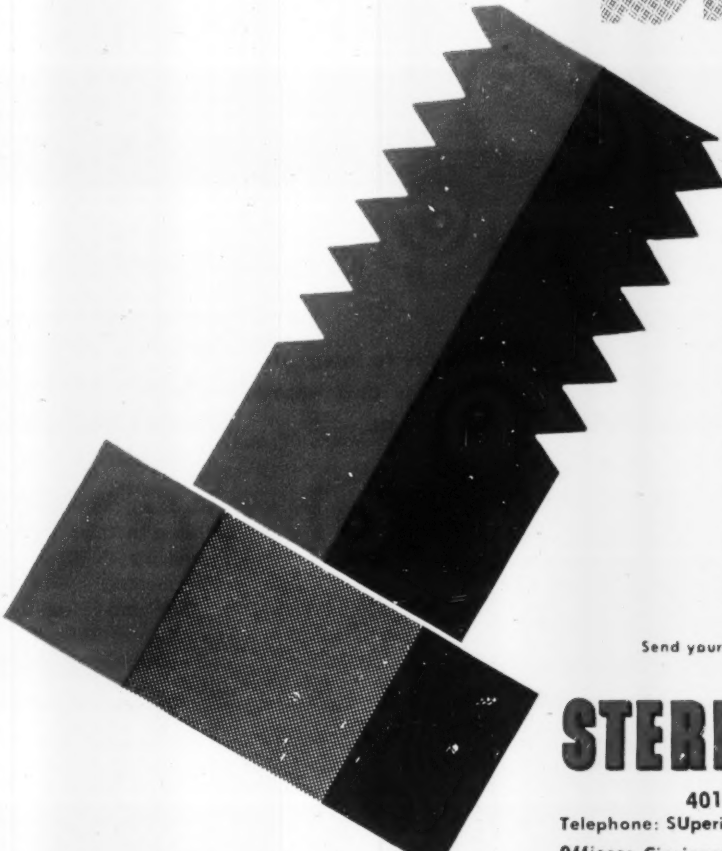

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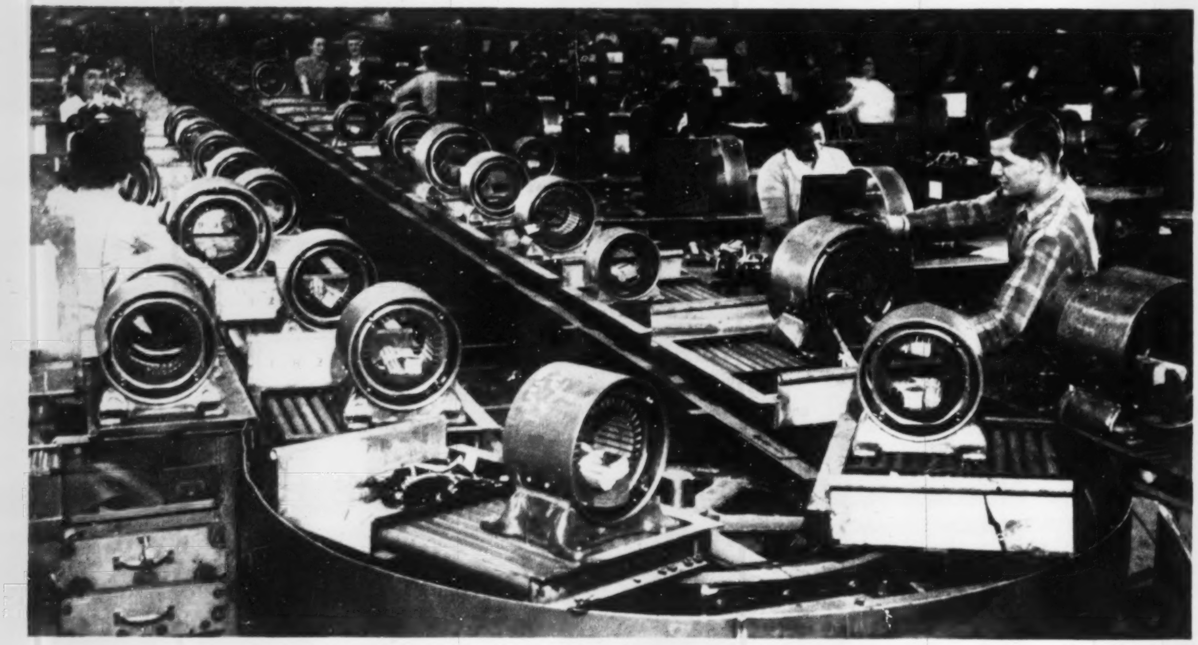


Motor components are matched, then distributed to winding positions by this carousel conveyor moving continuously at 32 fpm. Each carrier on carousel has a roller conveyor surface for easier transfer

FORUM ON TECHNICAL PROGRESS

Handling and Packaging

Management is assigning top-level responsibility to integrate handling and packaging with processes. Better methods and improved tools hold promise for substantial savings in labor costs

YOU may not have a single man assigned to planning and supervising materials handling in your plant. But, handling can figure out to be as much as 30 per cent of your total production costs.

Handling and packaging operations are one of the last frontiers of cost saving and one of the quickest ways to more profits. Result: Cost-conscious management is changing its view of these activities.

Many firms are assigning top-level responsibility for handling and packaging operations — leaning away from the hit-or-miss policy of letting each department run its own show.

Competent handling methods are being integrated with industry's effort to make operations more automatic. Integrating handling with processing, assembling and packaging is a primary effect of better planning. This is being applied in plants that are still in the blue print stage as well as some that are a half-century old.

Mechanized and simplified methods also are holding packaging labor to a minimum. Engineers are taking the packaging of industrial products out of the shipping room and onto the drawing board. They are building methods around the product instead of fitting the product to the method.

Latest thinking tends to do away with the discrimination between industrial and consumer type packaging. Instead of considering the shipping container as merely getting the product from the loading dock to the consumer's receiving dock, it's now thought of as bridging the gap between the last machine in the producer's plant and the first machine in the user's plant.

The material handling industry

is providing tools for better handling. Trucks carry heavier loads, are equipped to perform a multitude of jobs. Overhead equipment moves faster and is subject to finer control. Packaging machines can be built into conveyor lines and operated automatically. Often several handling methods can be built into an operation to tie all phases together.

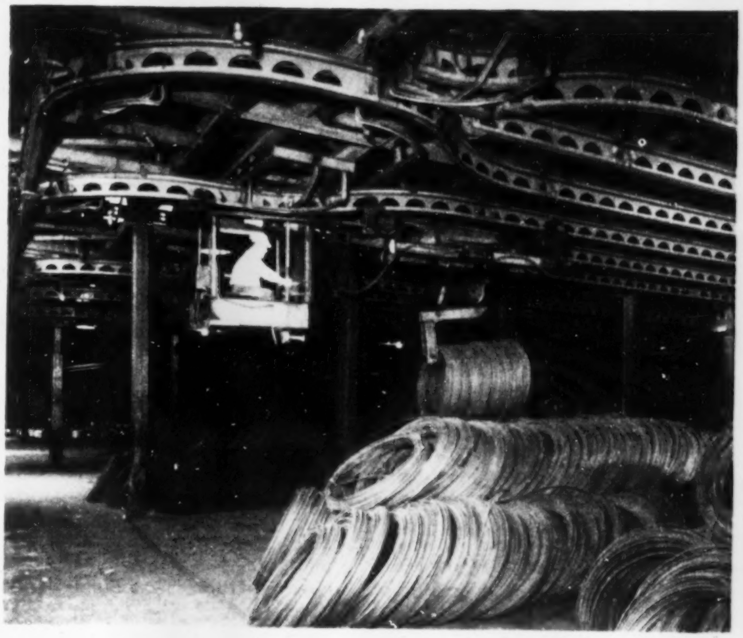
Integration Illustrated—A completely integrated handling system that pays off is Dodge Division's crankshaft press shop in Detroit. Billets stored outside the plant are lifted by magnet crane to a rack in the plant wall. They are pushed hydraulically through a warming furnace, then fall to a conveyor which moves them to a shear where they are cut into small pieces. By conveyor, parts move on to the rotary furnace, are picked up automatically by a hydraulic arm and lifted into the furnace.

Pieces are unloaded by a similar hydraulic mechanism, placed on a gravity conveyor and moved through a water descaler. They then pass through a reducer and are conveyed to the main press. Before heat treating, forgings are transferred to alloy steel monorail carriers, each holding four parts suspended vertically to permit flexibility in length of parts that can be handled. An air hoist elevator takes parts carriers to a supply station where they are moved into the furnace.

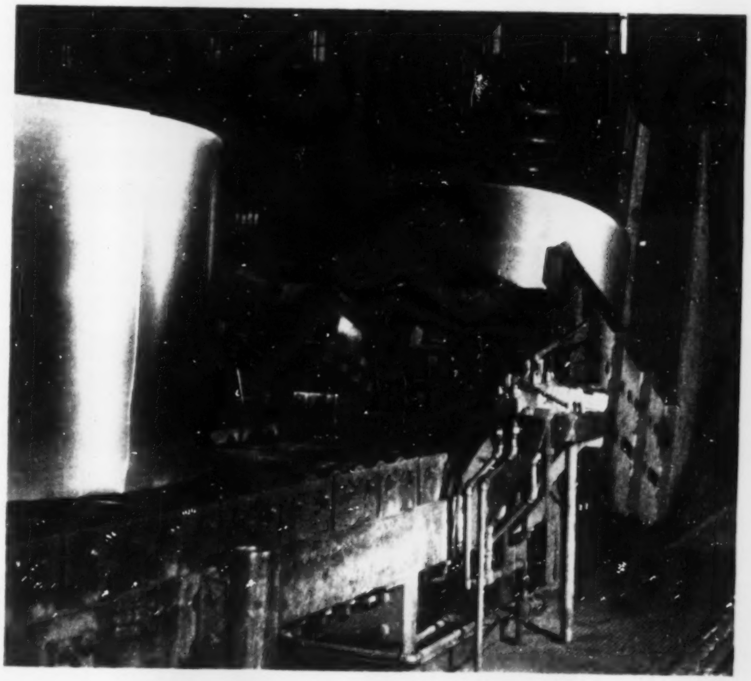
The whole operation takes about 8 hours. Up to the press, there is no manual handling of heated billets. After forging, they are handled only once. The continuous process is electrically synchronized, hydraulically and electrically actuated.

Advantages—Most plants can't use a handling setup as elaborate as the one at Dodge. But, that operation does show what can be done by proper integration and planned use of mechanization wherever possible.

Even on a smaller scale, dividends can be gained in lower cost production, better quality, increased safety. Less damage to parts occurs in a system where pieces do not strike each other or where they do not pile up in process.

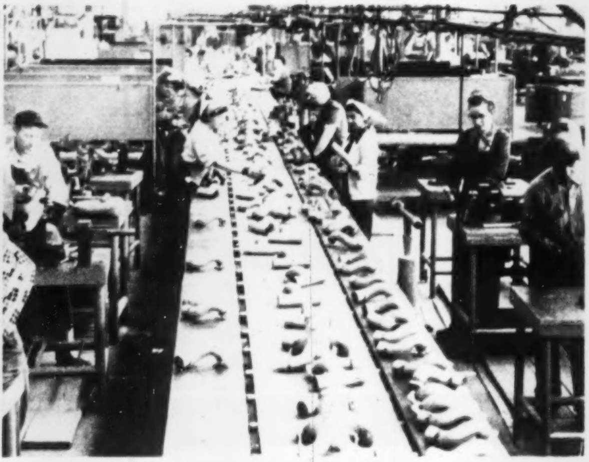


This Cleveland Tramrail system includes thousands of feet of arch beam trackage installed at Copperweld Steel Co., Glassport, Pa. Cab-operated carriers work continuously to handle the firm's rod output



Continuous integrated handling on heavy jobs is illustrated in this installation made by Mathews Conveyer Co., Ellwood City, Pa. Here a coil upender operates in a completely spring-mounted conveyor line

Higher speeds, better control are being built into cranes like this 4-ton 80-foot span Harnischfeger scrap handler



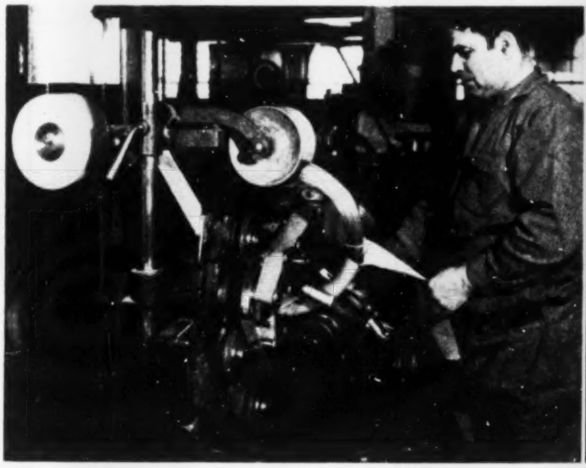
Ryan Aeronautical Co. saves 40 per cent of floot space with a 140-foot conveyor that moves parts in even flow

Moving Chips—Integrating chip disposal with machine operation is another move in direction of non-manual continuous operation. At General Electric Co.'s Erie, Pa., plant this system transports chips continuously from Gisholt automatic lathes to tote boxes while the machines are in operation. Effect is complete elimination of manual scrap handling and a considerable increase in disposal speed.

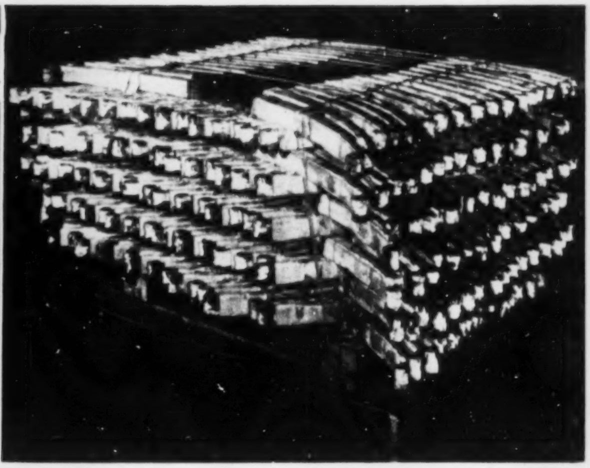
Conveyors funnel turnings and borings onto hinged steel belting, carried horizontally, until clear of the machine's mechanism. Chips are then transported parallel to the lathe line, up the conveyor incline, into tote boxes. Power is supplied by electric motor and reducer through an adjustable safety clutch. When a preset load limit is exceeded, the clutch disengages, stopping the system to protect both machinery and personnel.

Standardization Next—Design is sufficiently flexible to permit modifications according to type of tool, space available, type of scrap, rate of removal, etc. Belting has in-

MAY-FRAN AUTOMATIC
SCRAP HANDLING SYSTEMS
MAY-FRAN



Greaseless rust protection afforded by VPI paper will be extended from packaging to in-process ferrous protection



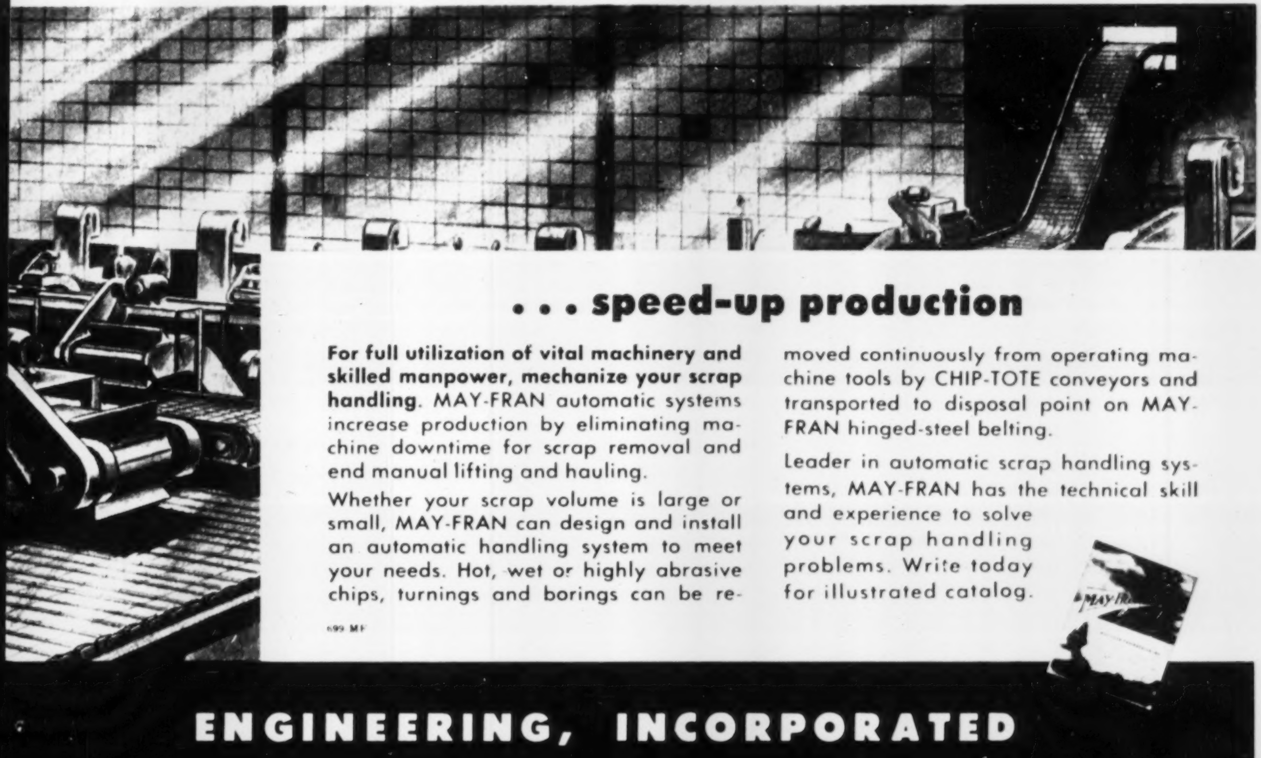
Steel strapping protects an investment. Here, round No. 8 wire makes car spring load easier and safer to handle

terlocked side wing design that prevents chip fall-through and insures uninterrupted material flow. When necessary, perforated links can be supplied to permit passage of coolants.

Effort is now being made to increase standardization of parts that comprise the bulk of the disposal units. Standardization should mean a sizable slash in initial cost. This is added to the 20 per cent increase in productive machine time on many jobs. Look for widespread expansion of conveyor use on multiple machining operations.

Ingot Guides—Another instance where localized pushbutton-guided mechanized handling should soon make a dent in manual requirements is in transferring steel mill ingot buggies. Used to carry white-hot 10-ton ingots from soaking pit to rolling mill, the buggies have always required men to perform the job.

This year two mills will place in service ingot carriers that have no apparent human guidance. All movement will be controlled by



. . . speed-up production

For full utilization of vital machinery and skilled manpower, mechanize your scrap handling. MAY-FRAN automatic systems increase production by eliminating machine downtime for scrap removal and end manual lifting and hauling.

Whether your scrap volume is large or small, MAY-FRAN can design and install an automatic handling system to meet your needs. Hot, wet or highly abrasive chips, turnings and borings can be removed continuously from operating machine tools by CHIP-TOTE conveyors and transported to disposal point on MAY-FRAN hinged-steel belting.

Leader in automatic scrap handling systems, MAY-FRAN has the technical skill and experience to solve your scrap handling problems. Write today for illustrated catalog.

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ENGINEERING, INCORPORATED

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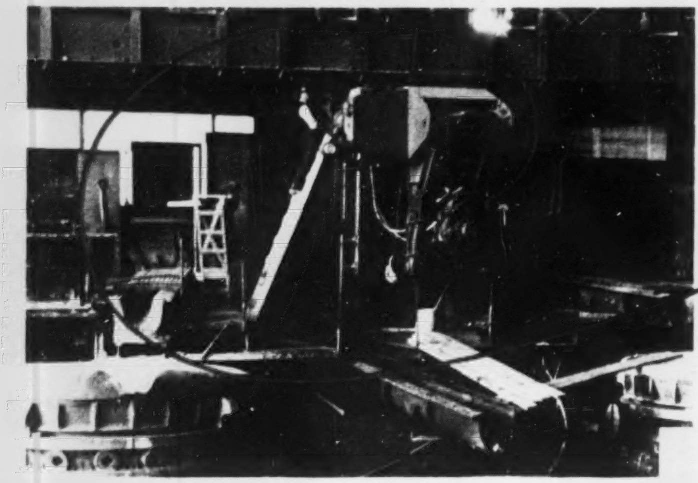
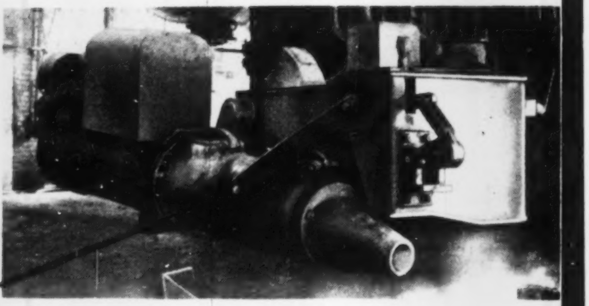
Bailey EQUIPMENT





At the left is shown a Bailey Clay Gun being installed on a large electric furnace. These guns, which have been standard blast furnace equipment for many years, now offer the same unique safety and performance characteristics for electric furnace operations.

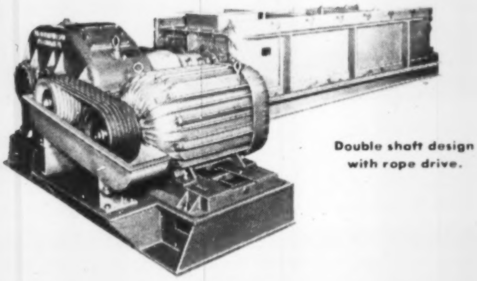
CLAY GUNS

Now . . . Unfailing Performance On

Electric Furnaces

As Well As BLAST FURNACES

The powerful Bailey Clay Gun now is providing best results and safety in plugging tapping holes of large electric furnaces. Thoroughly proved over many years of blast furnace service, this gun has a powerful, motor-driven screw which produces the piston pressure necessary to maintain long and uniform tapping holes. The special Bailey Lever Action forces the gun nose forward with certain accuracy.



Double shaft design with rope drive.

PUG MILLS

FOR SINTERING PLANTS AND BLAST FURNACE DUST CATCHERS

Carefully designed and ruggedly constructed to give dependable, continuous, low-cost service under severe operating conditions. Available are single and double shaft models, with direct, rope or gear drives

ALSO PRODUCERS OF

- **Cinder Notch Stopper**
- **Blast Furnace Cold Blast Valve**
- **Blast Furnace Blow-off Valve**
- **Check and Snort Valves**
- **Mixer and Check Relief Valve**
- **Blast Furnace Stove Checker**
- **Fabricated Steel Stove Bottom**
- **Precision Table Feeder**
- **Ladle Skulling Hook**
- **Check Valve for Cold Blast Main**

BRINGS *Safety* AND *Efficiency*

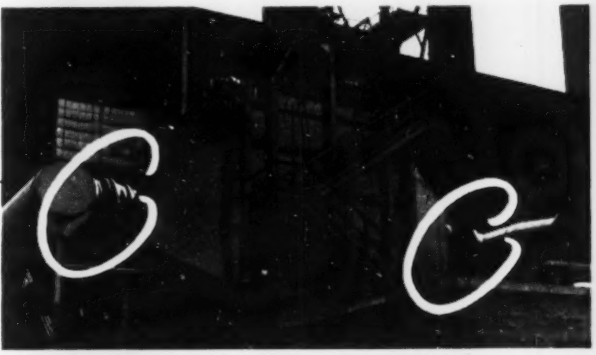
to STEEL MILL OPERATIONS

Recognized throughout the iron and steel producing industry for dependability and highest quality, Bailey equipment meets the vigorous requirements of many vital operations. Some of the principal items of Bailey equipment are shown on these pages.

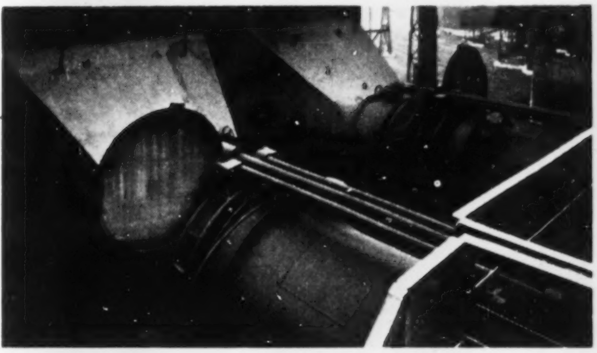
GOGGLE VALVES

MECHANICAL TYPE

In Bailey Mechanical Valves, a tight seal is secured by a powerful clamping force which is applied equally at all points around disc periphery. Regardless of time between operations, they open or close instantly. Sizes: 6" to 72", totally enclosed if desired.



Both photographs show Bailey Goggle Valves installed on ELEX Precipitators. Mechanical Type Valves were used on the installation above; Thermal Expansion Type on the one below.



THERMAL EXPANSION TYPE

When steam is passed into the three sets of tubes, thermal expansion frees the goggle plate. When steam is removed, contraction closes the flanges against the goggle plate. Diameters: 36" to 120".

WILLIAM M. **Bailey** COMPANY

ENGINEERS

LEADERSHIP THROUGH QUALITY

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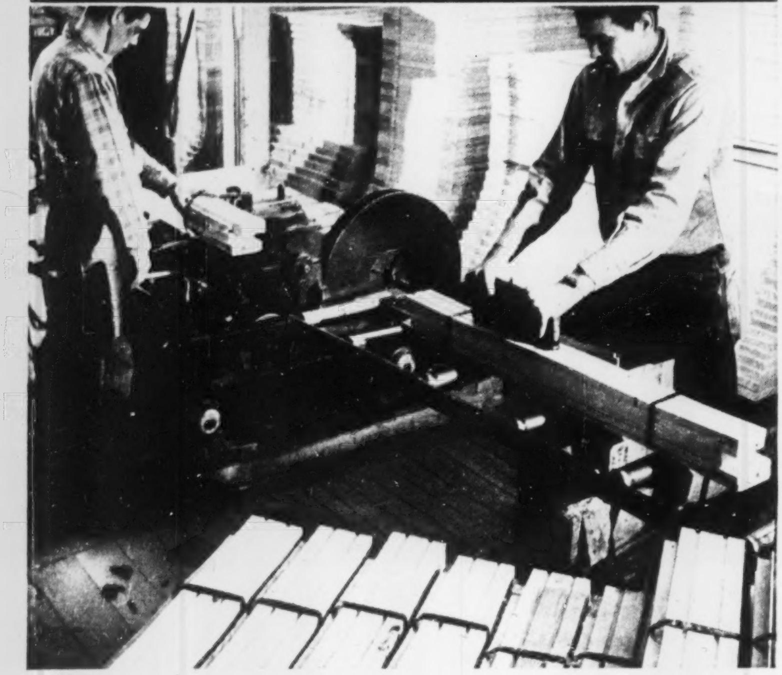
SLOWDOWN In Assembly?

Not when you bundle with a SIGNODE POWER STRAPPING MACHINE!



The happiest, most envied man on the production line—*and the pacesetter*—is the man on the *Signode Power Strapping Machine!* His job is easy and light, and well-strapped bundles roll off the line automatically! But faster continuous output is not the only advantage gained.

Power Strapping Cuts Costs Also

Signode's Power Strapping Machine releases several men for other jobs. It does the job of bundling safe and faster, with uniform tension on every strap. The machine is flexible, handling packages of varying sizes without adjustment. It is highly adaptable, strapping K.D. millwork, soft and hard wood flooring, shingles, crating lumber, expensive trim, etc. Strapped millwork and lumber is easier to handle, stack and tally. It can be loaded faster and enjoys protection from pilferage until used on the job.

Let's estimate your needs

Volume shippers usually have varying strapping needs. Let our fieldman survey your production layout and recommend the power strapping machine for the job. You'll be under no obligation whatever. Write

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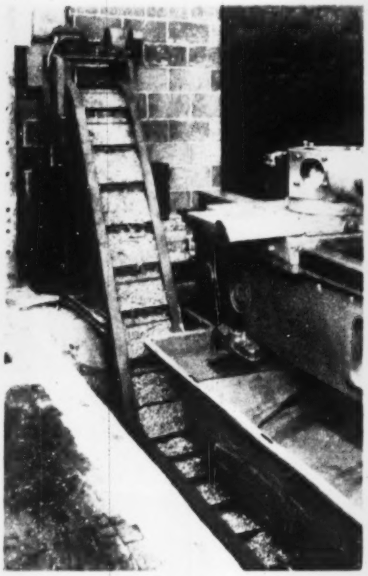
an overhead crane operator who drives the equipment that loads the ingot into the buggy. Toying with the control setup, the operator jockeys his buggy into proper loading position, then moves it on to the mill and unloads just by thumbing the correct button.

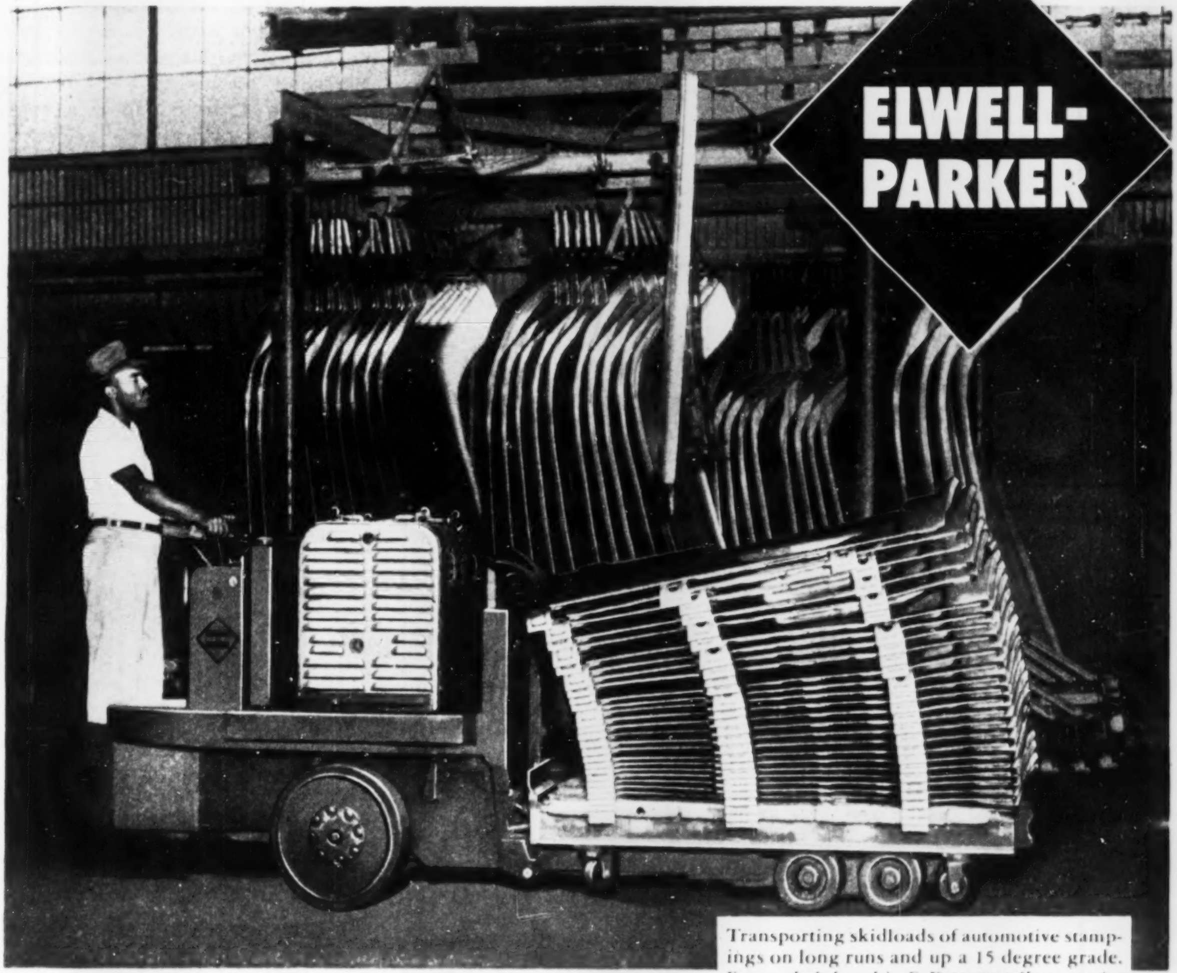
Higher Hoisting Speeds—Developments in overhead handling fall in line; accent is on greater speed, better control. An example is seen in magnet-operated scrap cranes. Heretofore, these units were considered quite rapid when they hit 35 to 50 fpm hoisting speed. Current speeds run up to 100 and 120 fpm. On the drawing board are scrap movers that reach 160 fpm.



Continuous mechanized chip disposal cuts manpower requirements, ups productive machine time as much as 20 per cent. This May-Fran Engineering Co. installation runs parallel with machine line, clearing chips without necessity of shutting down machines

One reason designers can project such rates is the advances made in perfecting alternating current control on overhead traveling apparatus. Even with high hoist speed, it is possible to maintain slow creep potential when the cranes are controlled through an electric load brake. In this area, development of a saturable reactor control for alternating current operation provides a cushioned

get MORE for your truck dollar from



Transporting skidloads of automotive stampings on long runs and up a 15 degree grade. For such jobs, this E-P 10,000 lb. capacity low lift platform truck is most economical.

because ELWELL-PARKER—

Furnishes ALL types—Elwell-Parker gives *unbiased* advice since it produces both gas and electric trucks. Basic models include high and low lift platform trucks, fork trucks, mobile cranes, tractors.

Builds trucks that cost less to operate—Unequalled design experience cuts maintenance costs and expensive delays due to truck breakdowns.

Offers FREE analysis by materials handling consultants—Resident E-P field men in all principal cities will survey your plant and help you select the most efficient handling system.

Provides service help—E-P Service Engineers make periodic calls to instruct your drivers and advise your maintenance department about proper servicing.

Get the full story on these *Plus Features* by writing for this General Catalog. The Elwell-Parker Electric Co., 4101 St. Clair Ave., Cleveland 3, Ohio.

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Power
INDUSTRIAL TRUCKS

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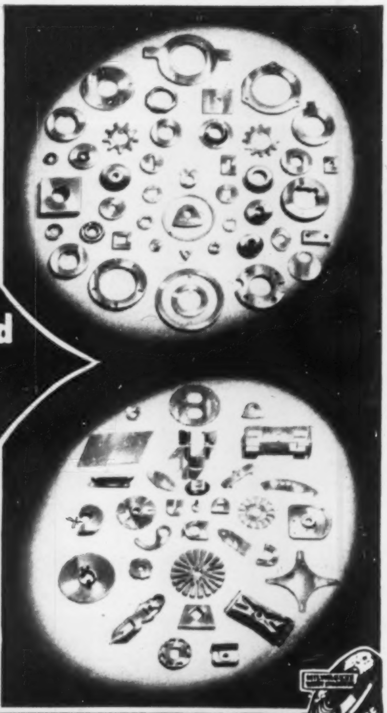

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start and smooth stepless acceleration to full speed.

Finer Control—Such fine speed regulation allows the operator to employ creep when necessary, yet go at high hoist speed—all within command of his master control lever. Higher bridge speed is also obtainable through an electric slowdown feature of the eddy current brake control.

Thus, it is no longer compulsory to depend on a hydraulically-operated foot brake alone for stopping the crane. Electric slowdown before the foot brake is applied should prevent wheels from skidding, increasing safety and improving accuracy in load spotting.

Versatility in handling is shown by this hydraulically-operated Yale & Towne device made for manipulating tinplate. It will pick up, rotate and square up to 6000 pounds of plate stock into unit loads, holding load compressed until it can be strapped

Faster Truck Service — Greater versatility and increased capacity are contributions of the mobile handling standby—the lift truck—to faster plant handling service.

Exemplifying the ability to haul heavier loads per trip are the 100,000 pound split-ram trucks that can now be produced by one manufacturer. In these larger capacities, two 80,000-pound split-ram types are in service at Great Lakes Steel Corp., Detroit, joining two other similar capacity units now operating at Bethlehem Steel Co.'s Lackawanna works.

Die handlers are following this trend toward heavier equipment.

PLYMOUTH
C.F.K. 102

PLYMOUTH — favorite switcher around the world

Wherever there's a need for dependable, economical transportation—at home or abroad—you'll find powerful 3-ton to 70-ton Plymouth Locomotives speeding production, cutting costs, boosting profits.

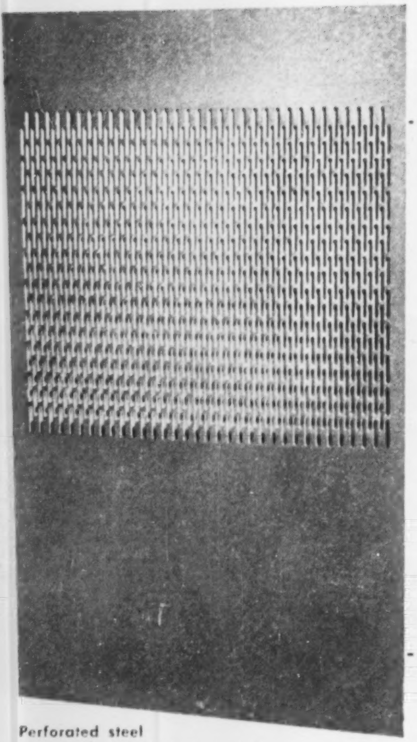
The picture is the same around the world. A 35-ton Plymouth (shown above) hauls passenger cars in the heart of the Belgian Congo. Another switches carloads of steel in South Africa. Still others haul cars of sugar on plantations in Mexico, the Hawaiian Islands, Puerto Rico.

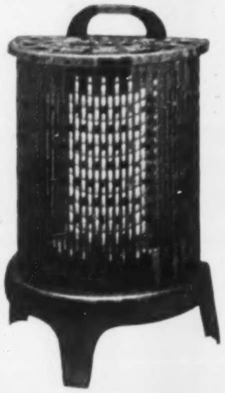
While at home—an owner in Michigan reports, "Less than a day for maintenance a year!" From Connecticut: "Plymouth has increased production, reduced our costs." Others report savings of 66 2/3%. 27 years of operation and still going strong.

Get the facts now! Find out which Plymouth performs most efficiently for your needs. Completely new catalog describes gasoline, Diesel, Diesel-electric models for narrow and standard gauge . . . and Plymouth's Torqomotive Drive for smoothest possible operation. Send for your copy today. PLYMOUTH LOCOMOTIVE WORKS, Division of The Fate-Root-Heath Company, Dept. A-1, Plymouth, Ohio.

PLYMOUTH LOCOMOTIVES

ALSO MANUFACTURERS OF F-R-H CERAMIC MACHINERY





Wesix Electric Heater

Perforated steel
sheet with side-staggered slots

HENDRICK PERFORATED METAL
has wide range of uses
in Modern Designing

Here is a typical example of how Hendrick Perforated Metal is used by a stove manufacturer to secure strong and rigid construction with light weight; protection of the heating coil, without interfering with radiation of heat; economical production; and attractive appearance.

Hendrick supplies perforated steel sheets as illustrated, and the Wesix Electric Heater Company uses them in fabricating its lightweight electric heaters.

For scores of other purposes Hendrick Perforated Metal is being utilized with equally satisfactory results.

Hendrick engineers will be glad to give you the benefit of their broad experience by recommending the most suitable kind and gauge of metal, and shape and size of perforations, to meet the requirements for any particular product for which you would like the advantages of perforated metal.

Write for complete information.

SEE OUR CATALOG IN SWEET'S

HENDRICK
Manufacturing Company
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Sales Offices In Principal Cities

Perforated Metals
Perforated Metal Screens
Wedge-Slot Screens
Architectural Grilles
Mitco Open Steel Flooring,
Shur-Site Treads, Armorgrids

Last year, some models reached 50,000 pounds capacity, with larger types regarded practical and on the way.

Fewer Pallets — Versatility of current die handling models is illustrated by the optional push-pull devices for handling new heavy dies in the automotive and aircraft industries. On standard trucks in the 4000-pound type, the versatility factor is emphasized by a model that has ten built-in attachments to handle any shape or size container within weight and size limits.

A natural result of more and better attachments is a continued reduction in pallet requirements. This offers prospects for considerable future savings, not only from original investment, but in the expense of shipping and getting pallets back, and from wasted space necessary for storage.

Increasing versatility on standard 4000-pound trucks is seen in Baker-Raulang's Octopus. This is a fork lift outfitted with special-purpose carriage and four attachments, with which it shifts, picks up, manipulates, dumps or stacks about a dozen different types and sizes of loads

An example of efficient versatile handling can be seen in broader uses being made of clamping devices for both handling and manipulation of heavier tinplate loads. A new unit built for this job carries up to 6000 pounds of plate. It picks up, rotates and squares the stock into unit loads, holding the

FIELD REPORT

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of this cost-cutting experience

The rough, tough schools of competition and experience are great teachers.

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These field reports are from every corner of the country. Each report gives you a tested and successful handling improvement idea that could save you thousands of dollars yearly. You'll find many suggestions on how to use your present equipment in new ways.

Our surveys show that of those reports distributed, 75% have been kept by management men for future action. At least 20% of these reports have inspired immediate improvements in handling methods.

Rapistan invites you to share its long cost-cutting experience by indicating which of these factual reports will be helpful to you. Check the list on this page or just write today on your letterhead.

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Complete Rapistan Field Reports on how materials handling problems similar to yours have been successfully solved by and for leaders in your own field. Each report details the problem involved, its solution, and results obtained. Below is a partial listing of available reports. No charge. No obligation.

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☐ **Manufacturing** ☐ **Agricultural** ☐ **Wholesale** ☐ **Retail**

Check reports below which will be of greatest benefit to you:

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- ☐ **Auto Supplies**
- ☐ **Beverages**
- ☐ **Building Supplies**
- ☐ **Canneries**
- ☐ **Chemicals**
- ☐ **Cosmetics**
- ☐ **Dairy Products**
- ☐ **Fabricated Metals**
- ☐ **Floor Coverings**
- ☐ **Food Products**
- ☐ **Freight Terminals**
- ☐ **Fruits, Vegetables**
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- ☐ **Metal Stamping**
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132 Rapistan Building, Grand Rapids 2, Michigan

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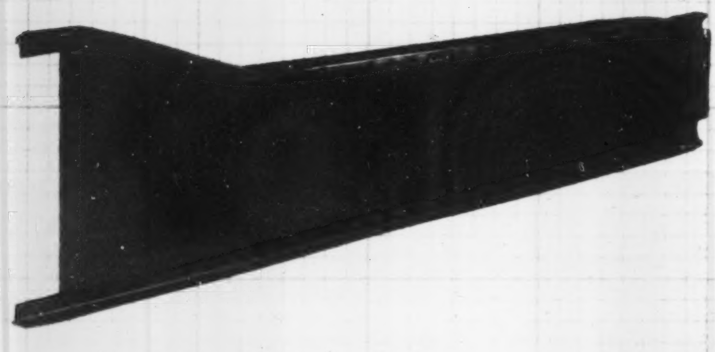
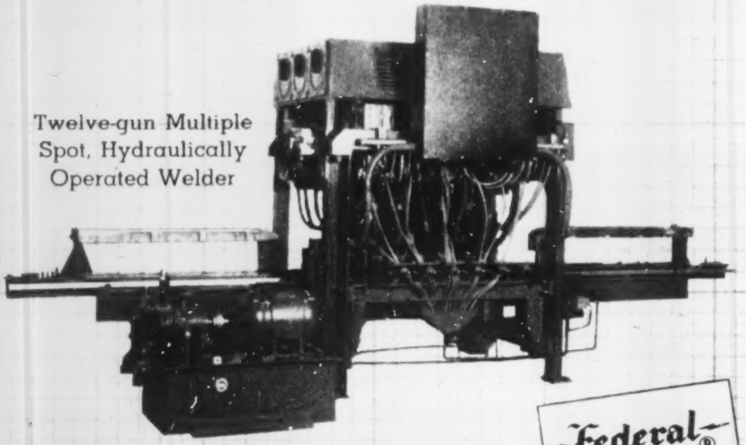


15,000 WELDS per HOUR

FEDERAL WELDER INCREASES PRODUCTION, CUTS COSTS ON NEW DESIGN AUTOMOTIVE FRAME CROSS MEMBER . .

It's happened again! A leading manufacturer has redesigned a product to receive the benefits of resistance welding. An automotive frame builder redesigned the cross members and asked Federal to build a machine that would weld the sections together.

Federal engineers designed and built two twelve-gun multiple spot, hydraulically operated welders that delivered 190 finished pieces per hour, doubling production and cutting costs by more than 25 percent. The welders are compact, releasing valuable floor space, with open framework that provides easy maintenance. The six 150 KVA transformers are arranged for three-phase distribution to equalize power demands. Equipped with shuttle type fixtures, the machines are constantly working . . . no down time while loading. These and many other features are reasons why this fabricator, like hundreds of others, has turned to resistance welding and Federal Welders for high speed, low cost and uniform quality production.



Twelve-gun Multiple Spot, Hydraulically Operated Welder

Federal® WELDERS

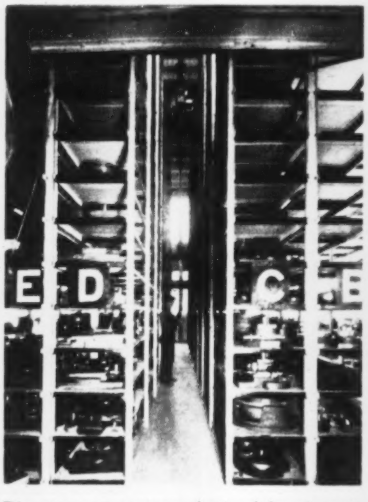
THE FEDERAL MACHINE & WELDER COMPANY
WARREN, OHIO

Warco PRESSES ®

load compressed until it can be strapped.

Maneuverability in truck design is paying dividends for users. Trucks are operated that stack and turn in 6-foot wide aisles, freeing in many cases 4 to 6 feet for productive work.

Other Power Sources—Extensive development in the diesel-powered lift field is making wider applications possible, especially on jobs in hazardous areas. Diesel power seems to come through nonexplosive and nonfume requirements with flying colors.



Die storage system devised by American Stamping Co., Cleveland, saves space, provides for quick and easy handling. Aisles are only 29⅜ inches wide, but dies are moved on a portable elevator in each aisle, with an electric crane supplying power

Elimination of carbon monoxide is relatively simple and complete. Diesels can be operated without electrical equipment. Engines are started by air or hydraulic starting motor. Economies in operation and maintenance also point in the direction of wider use.

Another potential power source is a battery which supplies electric power from radioactive isotopes. Industrial truck builders are speculating on the possibilities such a development would have in their product.

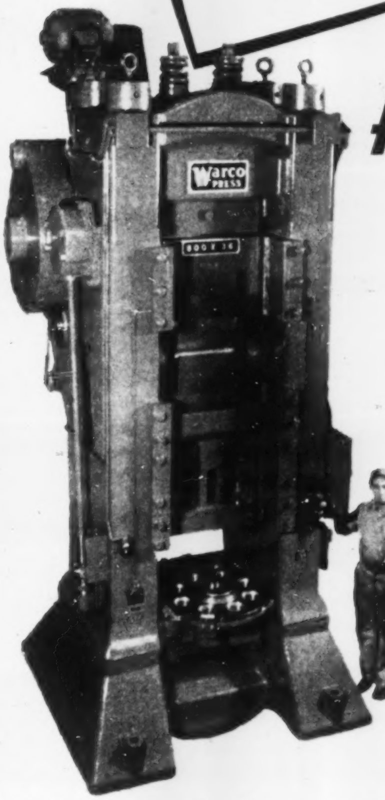
Improved Strapping—A power-driven strapping machine speeds high-volume flat steel strapping work and reduces operator fatigue by producing welded joints automatically. Designed for integration into standard conveyor lines, the setup accommodates a variety of package sizes and has no limit to the amount of strapping that can be fed or amount of slack that can be taken up. Welded joints approach tensile strength of the strapping size used.

Barge unloader built by Heyl & Patterson, Pittsburgh, moves 1350 tons of coal per hour. Hoist consists of an 83-foot-long elevator. As barges move continuously past the unloader, buckets take ½-ton bites from the pile. Three passes unload each barge

Another facet of the design is roller sections in the table top. This facilitates location of packages over the tensioning and welding unit to make manual lifting unnecessary. When a package is centered, the operator feeds out the required strap length by actuating a strap-feed pedal. The strap is tightened around the package to predetermined tension, cut from the coil, then welded.

Anti-Corrosion Packaging — Applications of a volatile corrosion inhibitor, called VPI (Vapor Phase Inhibitor), open up new possibilities in methods of packaging, storage and shipment of steel parts. Outstanding property of this powder-like chemical (dicyclohexylammonium nitrite) is its volatility which gives protection against water corrosion of metal

It's Warco PRESSES® Again!



WARCO now offers a line of Knuckle Joint (Coining) Presses featuring extra heavy frame of four-piece tie rod construction, oversize knuckle pins and bushings, specially heat treated and fitted to close tolerances and lubricated by a cascade system using motor driven pump, incorporating strainer and pressure switch protection.

Adjustment of ram is by means of taper wedge operated at floor level with mechanical locking adjustment mechanism.

Press is equipped with WARCO Pneumatic Friction Clutch and Brake assuring safe, smooth, economical operation.

The machine illustrated is equipped with WARCO Dial Feed and is used to cold nose 81mm. mortar projectiles.

Federal® WELDERS

THE FEDERAL MACHINE & WELDER COMPANY

WARREN, OHIO

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MORE
TONNAGE
PER EDGE
A

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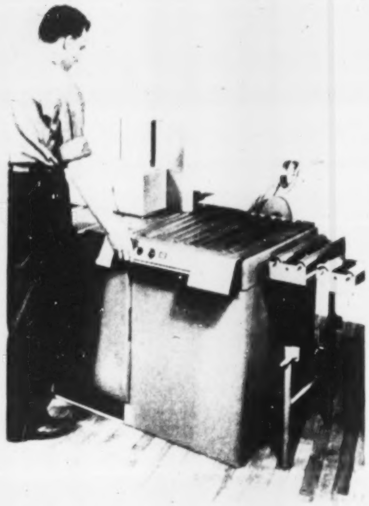
HOMESTEAD • PENNSYLVANIA**

surfaces in enclosed places. Manufacturers using the material are able to simplify their packages and eliminate coating of products and subsequent depreserving work.

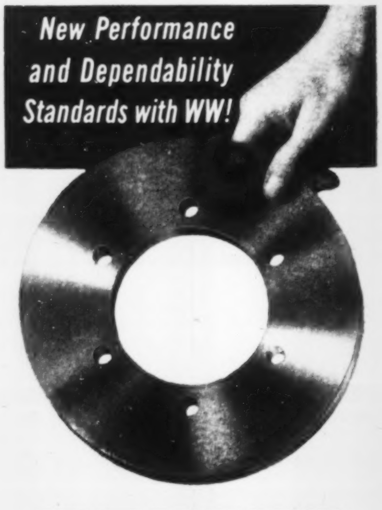
Although anti-corrosion packaging accounts for the major applications of this new concept of corrosion protection it is being increasingly used for in-process and between-operation protection of ferrous parts, either by wrapping with treated paper or by use of solution dips or sprays.



Power-driven strapping machine can be integrated into standard conveyor lines. Acme Steel Co. designed the unit to produce joints by welding

Both VPI powder in suspended muslin bags and coated paper are used to protect machine tools and machinery in packing and shipping. Aircraft industry is using the powder to protect vital engine parts during storage, shipment and overhaul.

Products ranging from needle bearings, water pumps, precision tool and die products, instruments, steel welding rods, inspection tools, gears, machine components, steel drums and on up to relatively large industrial air filter components are being packed protectively and less expensively with the aid of this volatile chemical. A manufacturer of diesel engine parts redesigned and simplified its packaging because VPI made waterproofing of packages unnecessary.



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We try to make wheel blanks available from stock for finishing to the following sizes:

Diameter:	7″	8″	8″	10″	10″	10″
Thickness:	3/8″	3/8″	1/2″	3/8″	1/2″	3/4″

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WHEELS ARE SUPPLIED IN WW-1, WW-2 AND WW-3 ALLOYS—(R.W.M.A. CLASSES 1, 2 AND 3)

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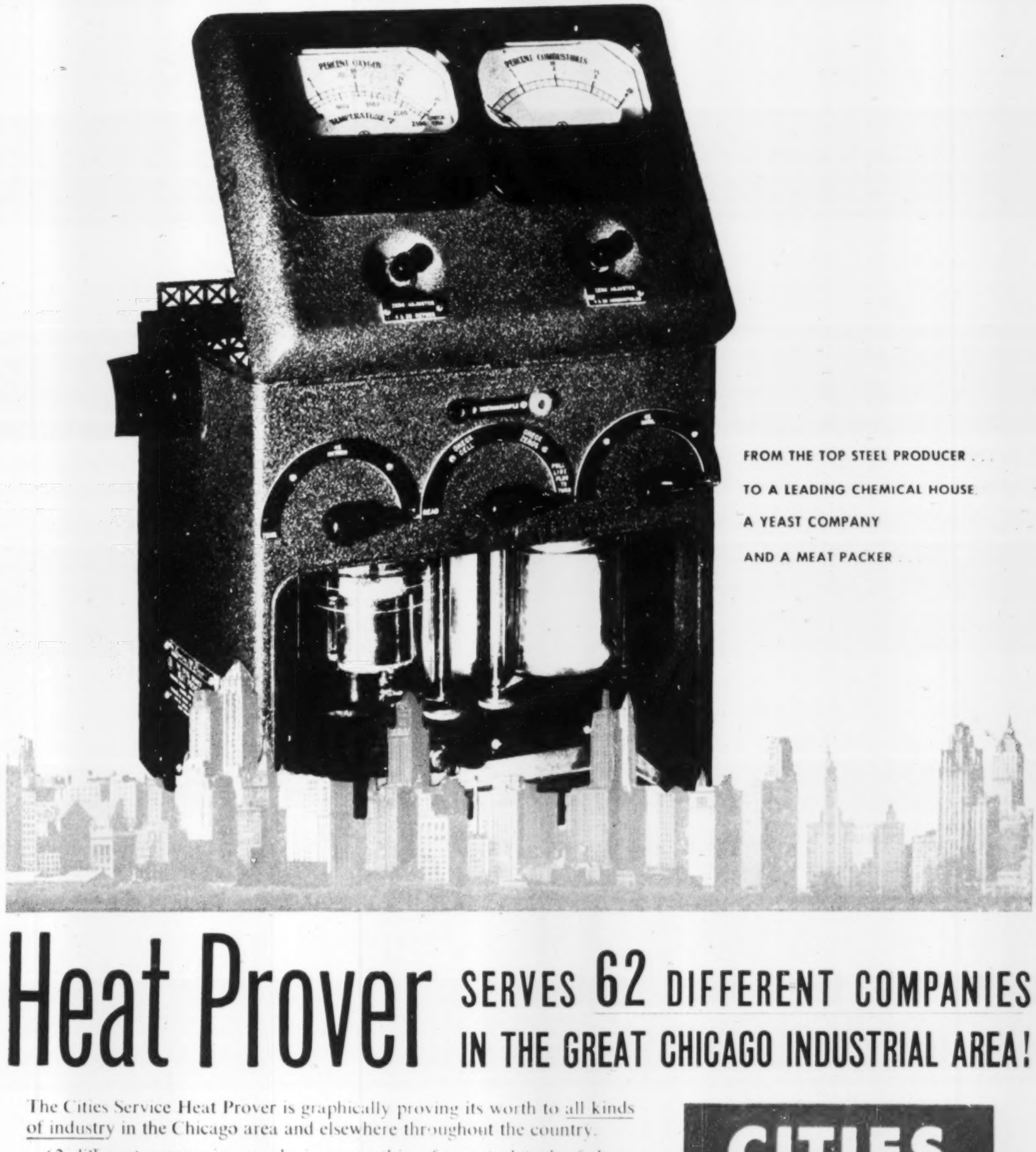

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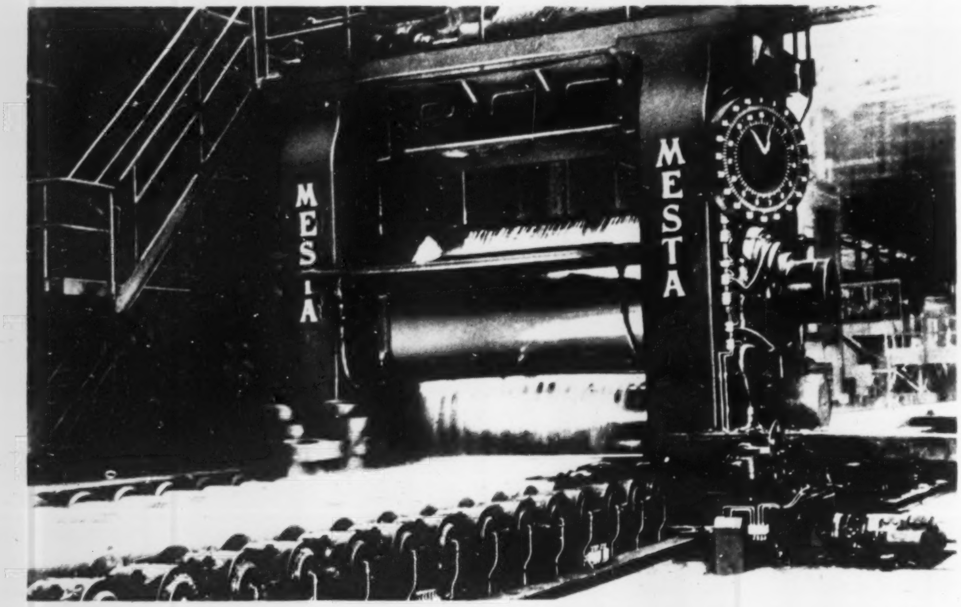


Centralized lubrication, as in this Farval installation, proves invaluable where equipment operates continuously

FORUM ON TECHNICAL PROGRESS

Lubrication

Intelligent analysis of the needs and enlightened application of lubricants pay off in direct production gains and reduced maintenance. Ttrend is toward centralized systems, multi-purpose lubricants

LUBRICATION is becoming a science.

The information gleaned from field experience and research projects is being directly applied to ease maintenance and production pains throughout industry.

Demands for ultimate output from existing equipment, shortage of machine tools, high labor rates and material shortages all bear directly on the increasing awareness of the roll of good lubrication in the program of production.

Whether its production efforts are directed toward defense or peacetime goods, industry will continue to utilize it's new-found ally and the demand for practical, efficient lubrication will continue to grow.

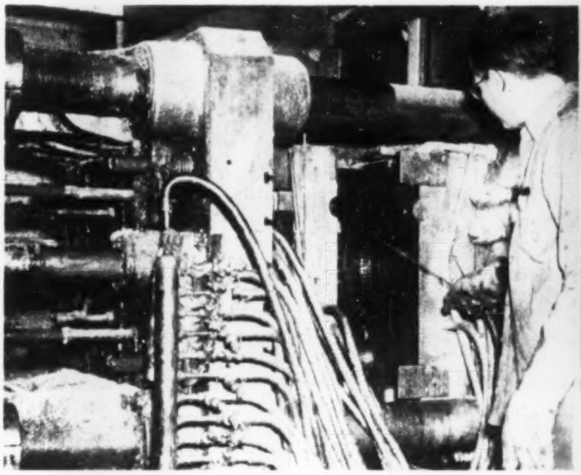
Proof of the Pudding — Many case histories give conclusive proof that a switch to the proper lubricant is profitable in several ways. Special lubricants with special additives greatly increase abilities to carry heavy loads. Others operate under extreme temperature conditions without breaking down or loosing their lubricity. Combinations of other features in special lubricants meet other specific requirements.

Even though this theory of special lubricants works in almost every case, a warning must be sounded. It is theoretically possible in a plant with 100 different machines, to produce evidence showing need for 100 different lubricants.

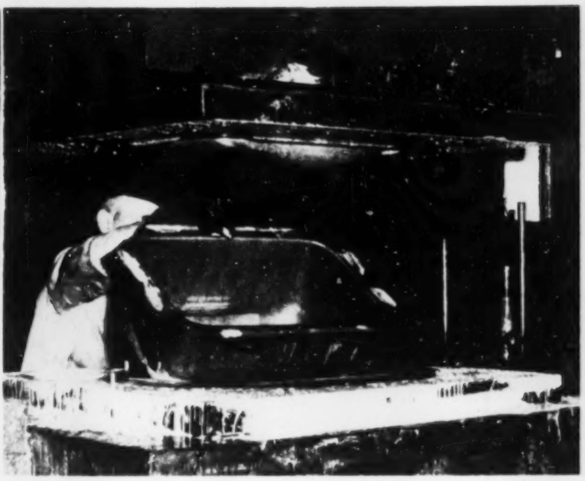
Won't Work—This would be impractical from almost every point of view. For one thing, it would require storing 100 separate containers.

Also small-lot ordering would increase cost. The maintenance man would find it easier to put the wrong lubricant on the wrong job. In some cases this could be disastrous.

Somewhere between the two extremes of one lubricant for each machine and one for all machines



Blowpipe method is used to lubricate large die cavity. It disperses lubricant and blows out excess at same time



Less scrap and less downtime for die maintenance result from phosphatizing flat stock for use in drawing

there's a sensible balance for each company.

This balance occurs at a different level for different plants. Large plants, as an example, may be better equipped to handle many varieties from the storing and handling angle.

The Rub—Attempts to standardize on fewer than the maximum number of grades introduce some selection problems. The top grade can't be chosen since to standardize on it would be prohibitive from a cost standpoint. Neither can the lowest grade be used since it won't work in some machines.

Right choice is usually the number two or three grade. While some lubricating efficiency is lost in some of the machines, the ledger will balance because of cost savings accruing from the handling of fewer different products. There will also be a reduced risk of the wrong lubricant being used on any machine.

Fewer Items—Multi-purpose approach to the problem of grease lubrication is on the upswing. Development, research and field testing of many selected greases have paved the way for the advent of the lithium greases and other effective media for achieving multipurpose function.

An example can be cited where one plant cut its grease requirements from 125 brands and weights to 6 types of multi-purpose grease. Savings of this magnitude will attrack many more customers in the coming year.

From One Tank — Centralized systems of lubricant supply and application, wherever practicable, offer advantages to many different machines. Steel plant use of some centralized scheme is now commonplace.

Many machine tools have centralized systems incorporated in their original design and many more have the system added after they reach the customer plant. Expect wider use of centralized lubrication on all types of machines.

These systems eliminate the practice of over-lubricating, a common cause of lubricant waste. They assure that if one particular spot is to be lubricated every ½-hour, it gets done, even if the rest of the machine is lubricated only once a day. Many of these systems even have a warning system when the reservoir is low.

Bonus—Added advantage of the centralized system is the safety factor. Machines need not be shut down, an expensive procedure, but can be lubricated while in full production without any danger of accident.

Trends toward and arguments for standardization and centralized supply do not quarrel with the use of specially compounded products. Certain operating conditions make it almost impossible to operate without some special lubricant.

Special Conditions — Under extreme loads high film strength and load-carrying ability is an absolute necessity. If the film strength is not sufficiently strong, metal-to-metal contact occurs and the lubricant achieves little or nothing. Leaded lubricants are an example of high load products.

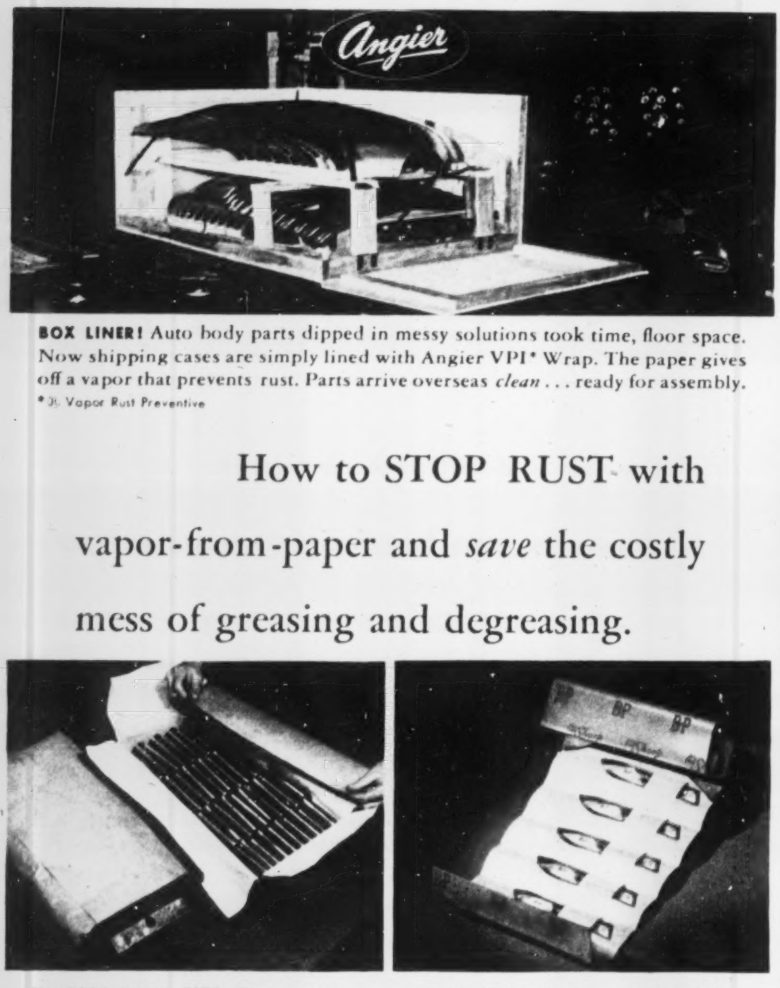
Temperature conditions, also, can create a need for a special product. The lubricant must not break down at high temperatures or in other cases it must remain fluid at low temperatures.

Like a Duck — Water-shedding oils and greases stay in place and continue to function properly where the operating mechanisms are constantly exposed to moisture. In some cases direct water spray will not dissuade the lubricant from doing its job.

This water-shedding ability greatly increases the time between lube applications thus cutting maintenance costs.

Lube Carrier—Some prelubricating coating such as the phosphates extends the effectiveness of lubricating in some metal forming cases. It acts as an adhesive carrier for the lubricant and assures its remaining where it will do the most good.

In wire drawing operations these coatings are used to prevent metal-to-metal contact. In addition to the chemically-bonded, mentioned



BOX LINER! Auto body parts dipped in messy solutions took time, floor space. Now shipping cases are simply lined with Angier VPI* Wrap. The paper gives off a vapor that prevents rust. Parts arrive overseas *clean* . . . ready for assembly.

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How to STOP RUST with vapor-from-paper and *save* the costly mess of greasing and degreasing.

IN TOTE PANS VPI Wrap protects parts in-process over week-ends or for months on end. They're always clean, ready for instant use.

VPI WRAPPER eliminates oil bath for surgical blades. Saves handling, so blades stay factory-sharp. Rejects due to rust spots have stopped.

SHROUD of Angier VPI Wrap keeps steel coils *rust-free* during shipment or storage. Saves the cost of spiral wrapping individual coils.

IN YOUR OWN TOOL BOX! Send for *FREE* VPI *SAMPLE*. Try it and see why plants *throughout* the metalworking industry are using . . .

Angier VPI® *Wrap*

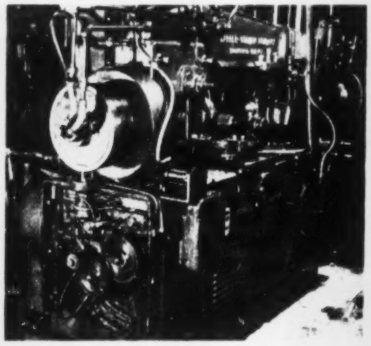
The PROVEN *Vapor* Rust *Preventive*

ANGIER CORPORATION, Framingham 8, Mass.,—Distributors in Principal Cities

above, the physically held, such as lime or borax, are used.

Lubricant coatings, chemical combinations providing the essential elements of both under-coating and lubricant in one adherent formulation are satisfactory in certain specialized applications like cold-heading and will be improved to provide a lubricant for more general use.

Under Pressure — Oil can be broken up into microscopic particles and these particles carried in air. This mist system has most success in the lubricating of bearings.



Oil mist lubrication installed on this hobbing machine has brought the temperature of the main spindle down from 165° F maximum to 155° F maximum. Result is truer running spindle

One advantage results from the slight pressure used. It creates an actual pressure in the bearing area which is slightly above atmospheric and thus helps keep dust and other contaminants out.

Cutting Fluids—Work on application of lubricants to cutting tools continues. Much of it is devoted to the method of application. One system uses fine streams of lubricant fired from underneath the cutter. These jets are directed just below the cutting edge.

When they hit the tool they're broken up into a fine mist. The mist is drawn into the chip-tool interface. Actual cutting data show the tool is better lubricated than with straight overhead flooding. Work on this project now centers around the application of some soluble oil to the system.

One Goal—Other methods of application are being explored. Most

clear call for

Titan brass

If, like Tar Baby, the metalworking industry sat still and said nothing, little could be learned of its original-metal needs and demands. Scant progress in original-metal production would be the result.

But unlike Tar Baby, industry is dynamic and outspoken in its demands. It ever sounds a clear trumpet call for metal quality and endurance.

Titan brass for 37 years has answered that call. The *billionth* pound of Titan free-cutting brass rod—the most easily machined of all metals and alloys—was delivered this year.

For *your* metal money's worth, try Titan brass products.

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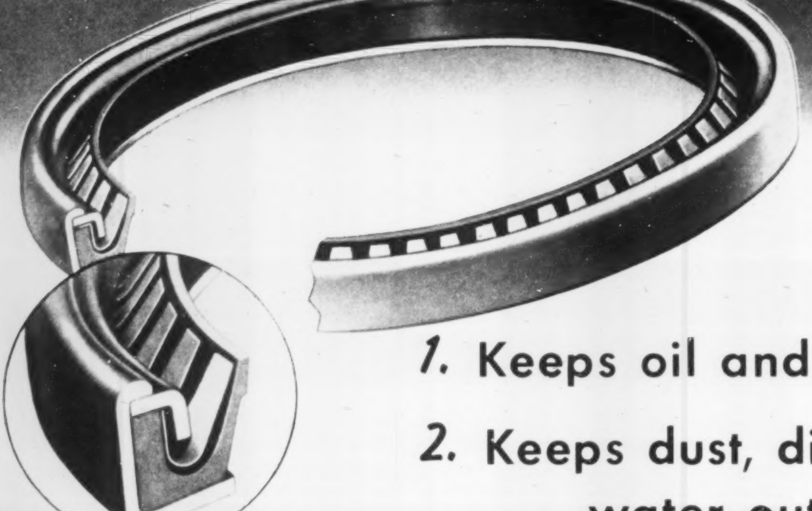

1. Keeps oil and grease in

2. Keeps dust, dirt and water out

Bearings *last longer* and require *less maintenance* when they're protected by Garlock KLOZURE Oil Seals. These superior oil and grease seals keep the lubricant sealed *in*—keep dirt and contaminating materials locked *out*.

Garlock KLOZURES are produced in a wide range of sizes including Metric to fit standard International Millimeter ball and roller bearing housings. *For complete information write for Klozure Catalog No. 10.*

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PALMYRA, NEW YORK

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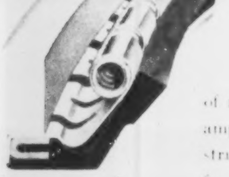
Specially Designed KLOZURE Oil Seals



For those applications for which none of our regular KLOZURE* models are suitable we design and manufacture oil seals of many special types. Examples of such special constructions are . . . small seals for needle bearings . . . seals for self-aligning or spherical bearings . . . and heavy duty seals as illustrated at the left for steel mill roll necks or other shafts of large diameter. If you have a bearing seal problem let our experienced technical staff solve it for you.

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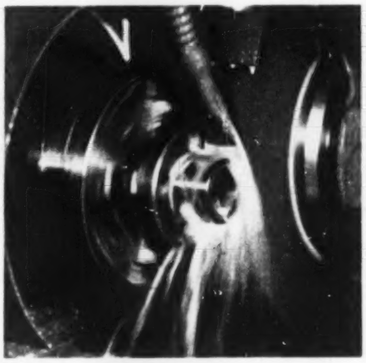
GARLOCK
Klozure*
Oil Seals
For all types of bearings

of them are old ideas with new knowledge applied to the method. These include feeder grooves in the flank of the cutting tool combined with flooding of the tool from below. Another is the use of mist application of the fluid. All of these efforts are directed toward getting the lubricant between the chip and the tool. That's where the lubricating must be done. Look for continuing progress in the direction of refining of basic cutting-principle information.

Similar Factors — Cutting tool lubrication also has its problems of special purpose versus multi-purpose products. Each has definite advantages and apply to specific conditions.



On any metalcutting or grinding job the oil or coolant must be directed so it will reach the area of work. Keeping nozzle down close prevents fluid from splashing away uselessly

Centralized supply of cutting fluids is the same as in the field of centralized machine lubrication. It reduces the cost of indirect labor

The Assumption—One filter-unit will handle the fluid for many machines. Centralized supply again is based on the premise that one fluid will work for all machines and all jobs across the machines.

Often this is true. Some soluble type product is probably the most common fluid used for centralized supply.

New Metals — Industry use of special alloys, poses new problems in this field of lubrication as applied to cutting fluids.

Chemically active oil type fluids are generally favored for this class of work, with some interest shown in special application methods and

AHEAD OF THE VAPOR TRAIL...

LEBANON Castings ARE AT WORK

THAT streak in the sky is a Curtiss-Wright Sapphire J-65 Turbo Jet Engine powering a high-altitude plane. The intense heat—approximately 1500° F.—developed during flight is enough to disintegrate "normal" materials, formed in the usual way. Yet in this inferno of power Lebanon Stainless Steel Centrifugal* Castings of special heat-resistant alloys are giving dependable service as . . .

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HEAT SHIELD SUPPORTS
EXHAUST CONE FLANGES
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*"CENTRI-DIE", patented name for method of casting steel centrifugally in metal molds, under license agreement with Firth-Vickers Stainless Steels Limited, Sheffield, England. Lebanon also makes steel castings, both static and centrifugal, in refractory molds.

Have you seen . . .
STEEL WITH A THOUSAND QUALITIES?

This 37-min., 16 mm., full-color sound film showing steel castings from blueprint to end use should be shown to your organization. For information, write: Dept. B, Lebanon Steel Foundry, Lebanon, Pa.

LEBANON Castings
CARBON, SPECIAL ALLOY AND STAINLESS STEEL
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LEBANON STEEL FOUNDRY LEBANON, PA.

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COST CUTTERS

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For over 70 years, STAR Blades have been *quality* blades—fine steel, carefully heat treated and processed on special machines of advanced design, makes STAR the blade you can count on.

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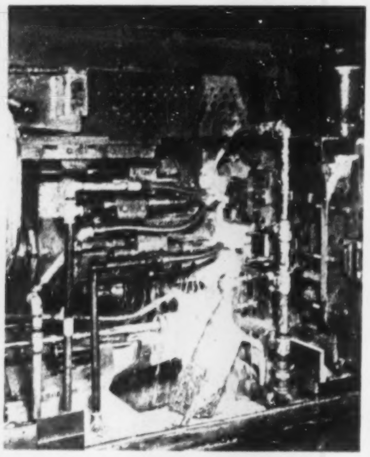
Makers of Hand and Power Hack Saw Blades, Frames, Metal Cutting Band Saw Blades and Clemson Lawn Machines.

also in carbon-dioxide as a coolant.

In Hogging—For routing and primary metal cutting operations entailing high rates of metal removal, water-based cutting fluids are increasingly utilized to good advantage. Such fluids include conventional soluble oils, heavy-duty emulsions and solution-type fluids.

Under severe hogging conditions, as encountered in certain drilling and boring operations, these solutions demonstrate remarkable production capabilities.



Abundant supply of properly directed cutting fluid, as in this multiple-spindle automatic job, assures proper lubrication, cooling and flushing of chips from the working area

De-Contaminating — Recent refinements in filtering and clarifying of cutting compounds give greater service life to the fluids. A large number of devices are on the market today for cleaning these coolants. Among these are magnetic clarifiers, web filters, screen-type filters, floatation clarifiers, metal-edge filters, depth-type filters utilizing various filter media, centrifuges and many others.

As in any other field of production or maintenance, the different systems all work but have different focal points as to application. Much consultation and advice is given without charge by the representatives of all the lubrication manufacturers. As each year is catalogued, suppliers have a greater backlog of experience to call upon in assisting users to make best application of the variety of products.

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—says REPUBLIC AVIATION CORP.
Makers of the famous F-84E THUNDERJET

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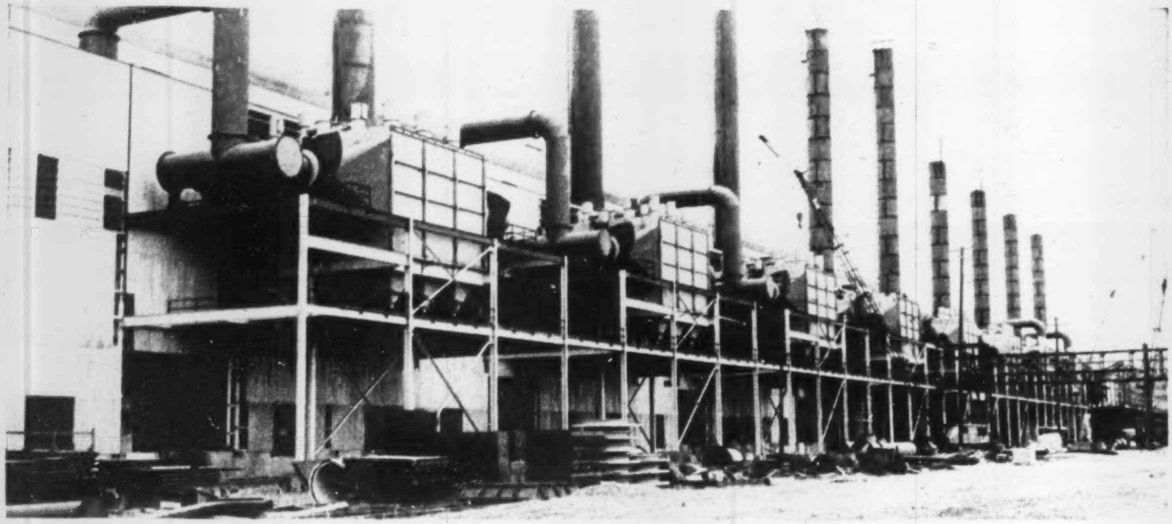


Twin electrostatic precipitators on all open hearths at U.S. Steel Co.'s Fairless Works cut air pollution by collecting 95 per cent of all dust and fume

FORUM ON TECHNICAL PROGRESS

Servicing and Maintenance

'Necessary evil' tag is disappearing from maintenance and service functions. Management is making well-planned programs pay. Key to success: Proper equipment to replace outdated practices

ANY TOP-NOTCH maintenance department is worth its weight in gold. Maintaining and servicing production and processing equipment and the plant housing it are assuming more importance in the plant operating picture. Outdated practices can cost real money.

The reason: As production processes tend toward greater automaticity, the skills of operators are being assumed more and more by machines. It is important that these complex machines be kept in top running condition. To do this calls for maintenance know-how and equipment just as modern as the machines.

In the plant, good housekeeping, attention to safety factors, proper lighting, heating and ventilating and occasional fresh coats of paint not only will preserve the property but pay off handsomely in improved worker morale.

Maintenance and service no longer can be relegated to the back room. Tools and equipment and experienced men to handle them cost money but plant operators are finding that they show up at the end of the year in tangible savings.

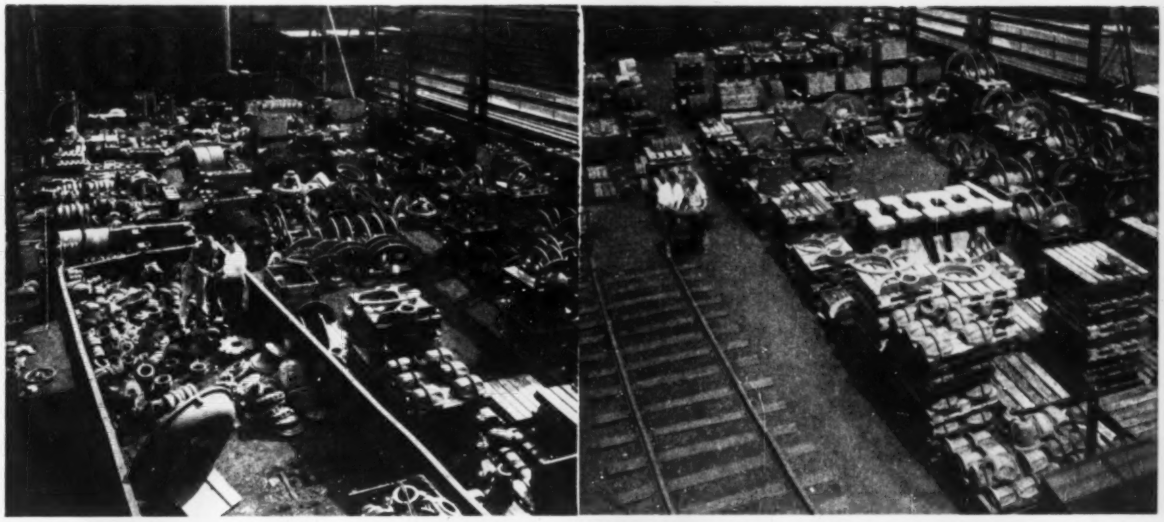
Where to Look—What's the key to efficient plant maintenance? Good organization is certainly close to the top of the list. And that includes the right kind of paper work. The "necessary evil" philosophy is often so firmly entrenched that it interferes with setting up an organization

Management decisions regarding maintenance will certainly be more favorable when based on reliable records rather than guesses. Too, they help protect against practices that may prove to be false economy in the long run.

Here are some other questions that an executive with maintenance and service under his wing should ask if he is to have a top-notch department:

Does maintenance have suitable headquarters? Measure maintenance shops by the same standards that are established for production: Proper light, heat and ventilation. Give the maintenance engineer his own office with good filing and drafting equipment.

What About Portables?—Is full



Evidence of good housekeeping can be seen in before and after shots that show order restored out of chaos in an outside storage area. Management benefits from effective yard maintenance by manhours saved, lower accident rate

advantage being taken of the latest portable tools and accessories? Repair time may be cut by doing the job on the machine instead of hauling the machine to the shop. A good supply of tools should be carried by maintenance. Emphasize use of the right tool on every job just as for any other operation. Modern power tools, both air and electric, save time and effort on many repair jobs.

Does maintenance have the machine tools that are needed? Idle production equipment can often be rebuilt and put to work in the maintenance shop. However, it is false economy to pass on obsolete and inefficient machines to the maintenance department.

Several Ways—There is always the question of providing heavy duty machine tools for the larger jobs. Sometimes maintenance work can be scheduled during periods when the machine needed is idle in the production department. The job can be farmed out. Keep in mind that either way can mean costly delays and increased repair bills.

Does maintenance have the materials handling equipment it needs? There's a good chance that more facilities in the way of powered fork trucks, hoists, delivery trucks, and cranes can be used to advantage.

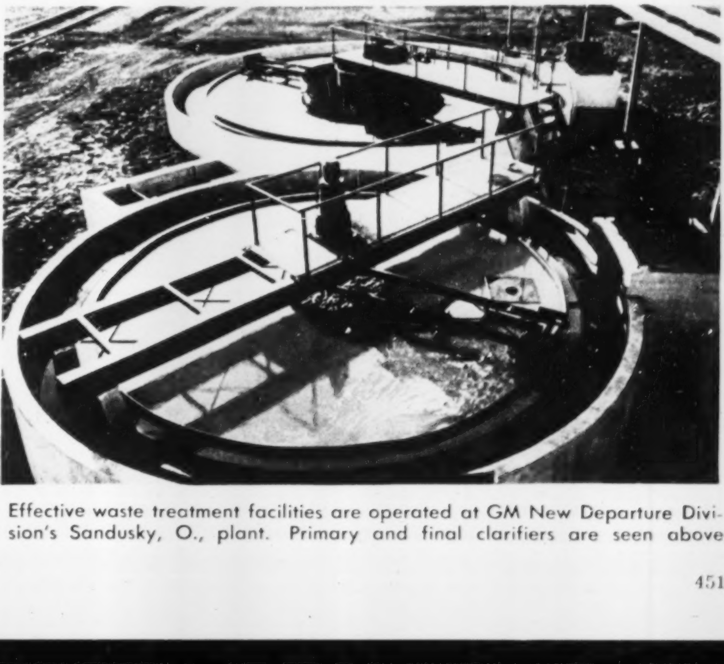
Special carts to help move equipment to the job are a big help in getting fast repairs. Carts can be equipped with vises and power tools and numerous other labor saving machines to be plugged in and used at the job.

Whose Job?—A ticklish problem that often arises is whose job is it to keep machining and production areas clean.

One plant with machinists working at about 1500 production machines took this question seriously and made a study. It was found to be cheaper to have the machinists clean up their own areas. This plant was able to cut its maintenance force in half by making the machine operators responsible for their own clean-up.

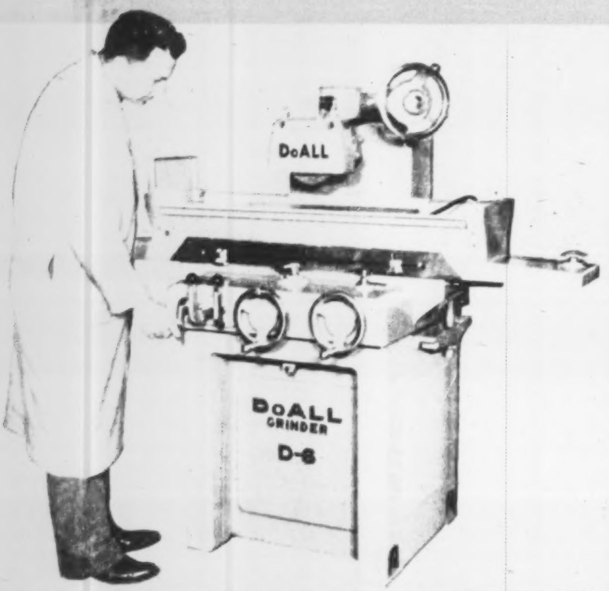
This system works well if the accessories needed to make the job easy are provided. Machinists dump their scrap into convenient barrels which are on wheels so that they are easy to move in any direction. Scraps can be swept into aisles at quitting time. Two maintenance men with power sweepers can clean up the aisles in no time. In handling scrap, trend is toward conveyors serving each machine.

Clean Air Pays—Clean air cuts

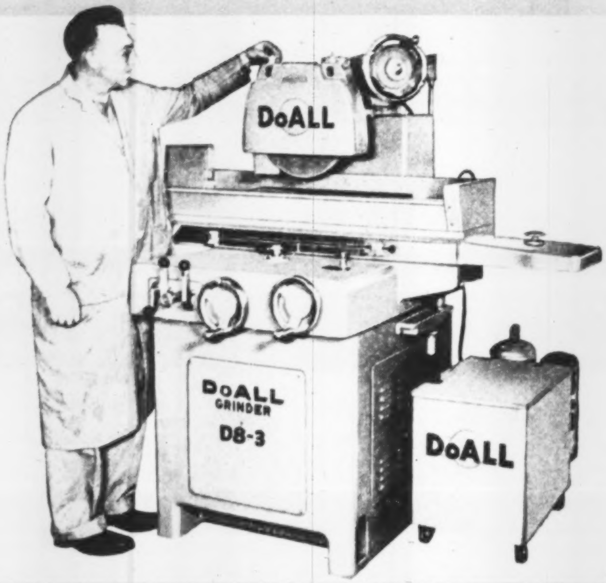


Effective waste treatment facilities are operated at GM New Departure Division's Sandusky, O., plant. Primary and final clarifiers are seen above

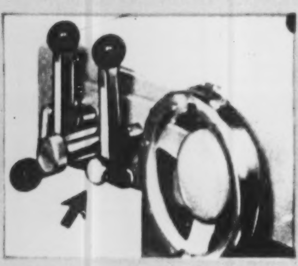
NOW... A GREAT



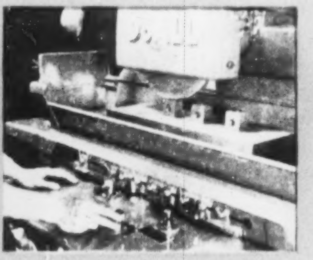
D-6 Models—6" x 18" and 6" x 24" sizes. Manual and hydraulic operation—7" wheels.



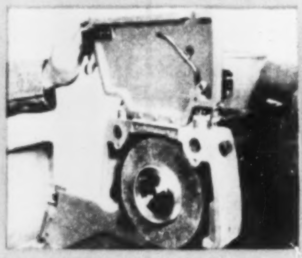
D-8 Models—8" x 24" with 10" or 14" wheels. Manual and hydraulic operation.



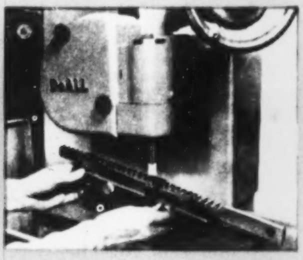
Variable speed wheel dressing feed.



Skip feed for intermittent plunge grinding.



New flood and "Cool-Grinding" system.

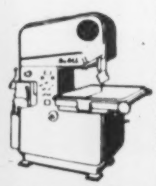


High speed spindle, vertical or horizontal.

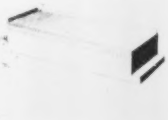
ATTACHMENTS and ACCESSORIES

1. **Coolant System**—"Cool-Grind" (coolant through the wheel) or flood grind, or both simultaneously.
2. **Coolants** for every job.
3. **New Laminated-top Magnetic Chuck.**
4. **Magnetic Sine Chuck**—for fast easy setups on single or compound angle work.
5. **Selectron**—for controlling magnetic chuck holding power—and demagnetizing.
6. **High Speed Spindle Attachment Vertical or Horizontal**—provides speeds up to 20,000 RPM, for use of very small wheels.
7. **Variable Spindle Drive**—electronic control provides infinitely variable speeds.
8. **Crush Dresser Spindle Drive**—slow-speed drive for wheel crushing.
9. **Crush Grinding Attachment**—provides steady table speeds down to 1" per minute—includes heavy duty spindle.
10. **Adjustable Crush Roll Idler Stand**—permits tilting of crush rolls.
11. **Motor-Driven Crush Roll**—for forming grinding wheel or crush rolls.
12. **Automatic Downfeed**—can be set to feed at each reversal, or alternate reversals of table.
13. **Automatic Skip Feed**—table travel speeds up between multiple work pieces when plunge grinding.

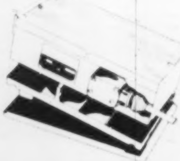
CALL DoALL
See your Classified Phone Directory for Local Sales-Service Stores



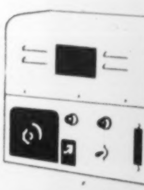
BAND MACHINES



MAGNETIC CHUCK

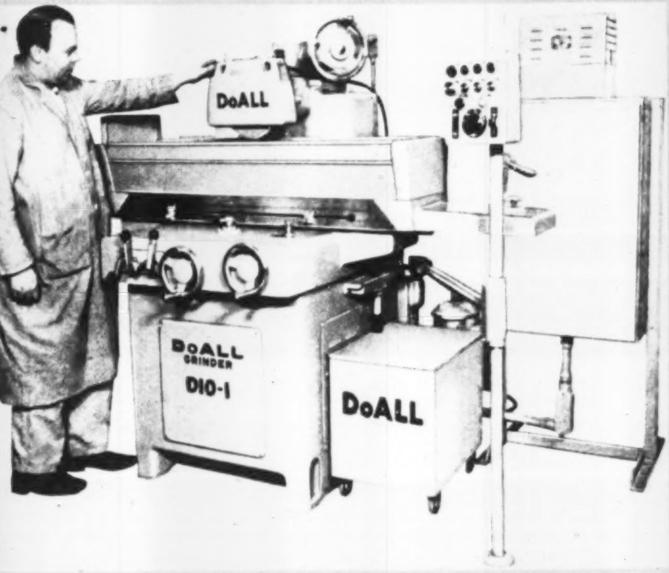


SINE CHUCK

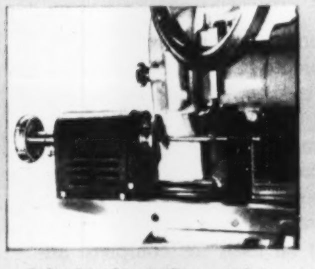


SELECTRON

NEW LINE OF DoALL *Precision* SURFACE GRINDERS



D-10 Models—10" x 30" chuck with 10" or 14" wheels.



Cylindrical grinding and indexing attachment.

Slip rings for zeroing handwheels.

NEW **SIZES—including 6" x 24" and 10" x 30".**

NEW **12½" WORK HEIGHT CAPACITY.**

NEW **SPEEDS—up to 100 fpm table travel.**

NEW **RECIRCULATING "COOL-GRINDING" SYSTEM.**

NEW **RIGIDITY AND STURDINESS.**

NEW **ATTACHMENTS AND ACCESSORIES.**

NEW **CONVENIENT CONTROLS.**

NEW **FULLY AUTOMATIC OPERATION.**

. . . and more!

NEW DoALL Surface Grinders will handle an unlimited variety of surface grinding, cylindrical grinding and form grinding jobs with a heretofore unattainable combination of precision and speed.

You have to see them perform to visualize their capabilities. Ask to have a free demonstration in your own plant. Call your local DoALL Sales-Service Store, or write:

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14. **Fully Automatic Surface Grinding**—controls cross-feed and downfeed automatically.
15. **Cylindrical Grinding Attachment**—for straight and taper cylindrical grinding and indexing.
16. **Dust Collector**—for all dry grinding operations.
17. **Wheel Dressing Diamonds and Holders.**
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19. **Set of Plain Centers.**
20. **Wheel Balancing Stand and Arbors.**
21. **Grinding Wheels.**
22. **Complete Electrical Panel Remote Control Systems.**

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DoALL
Precision
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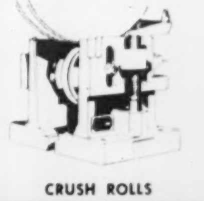
Free. Complete data and description of DoALL Grinder design and construction—coolant systems—controls—automatic setups—attachments. Ask for your copy.

COOLANTS

GRINDING WHEELS

DIAMOND DRESSER

DUST COLLECTOR



CRUSH ROLLS

DoALL
BLOCKS

GAGE BLOCKS

Important step in this Kahlman Floor Co. hard-top floor installation is removal of burlap after it acts to remove excess water

maintenance cost. There is less frequent need for cleaning building interiors. Motors, electrical contacts and other fine equipment last longer, and need less maintenance.

Advances in smoke and fume collection where particles in the 5-micron and smaller class must be eliminated were paced by improved electrostatic precipitation. The method proves effective on both oil and gas-fired furnaces.

U. S. Steel Co. makes important use of the precipitation system at its Fairless Works. Gas from each furnace passes through a waste heat boiler, then to a pair of precipitators and finally to the open-hearth stack. Twin precipitators on each furnace allow one to be taken out of service for maintenance without halting operations.

In the cloth filter field, progress is being made in extending applications to higher temperature for dust and fume collection. Development of satisfactory synthetic filter fabrics such as orlon is leading the parade of new applications. Now in design stage: new continuous operating cloth filters that will expand uses.

Flooring Trend—Lower upkeep costs are turning more plants to hard-top concrete flooring. Total area covered last year: About 5 million square feet.

Granolithic floors are produced by striking off the 6 to 7-inch structural slab ¾ to 1-inch below required finished grade, then installing a separate wearing course. This area requires materials and methods that produce greater density, toughness and wearing ability. Topping can be applied either on fresh slab or as one of the last operations after heavy construction. Proper low water-cement ratio is essential. In initial mix, enough water is used to gain complete adhesion of cement or paste to the aggregates, then excess water is withdrawn.

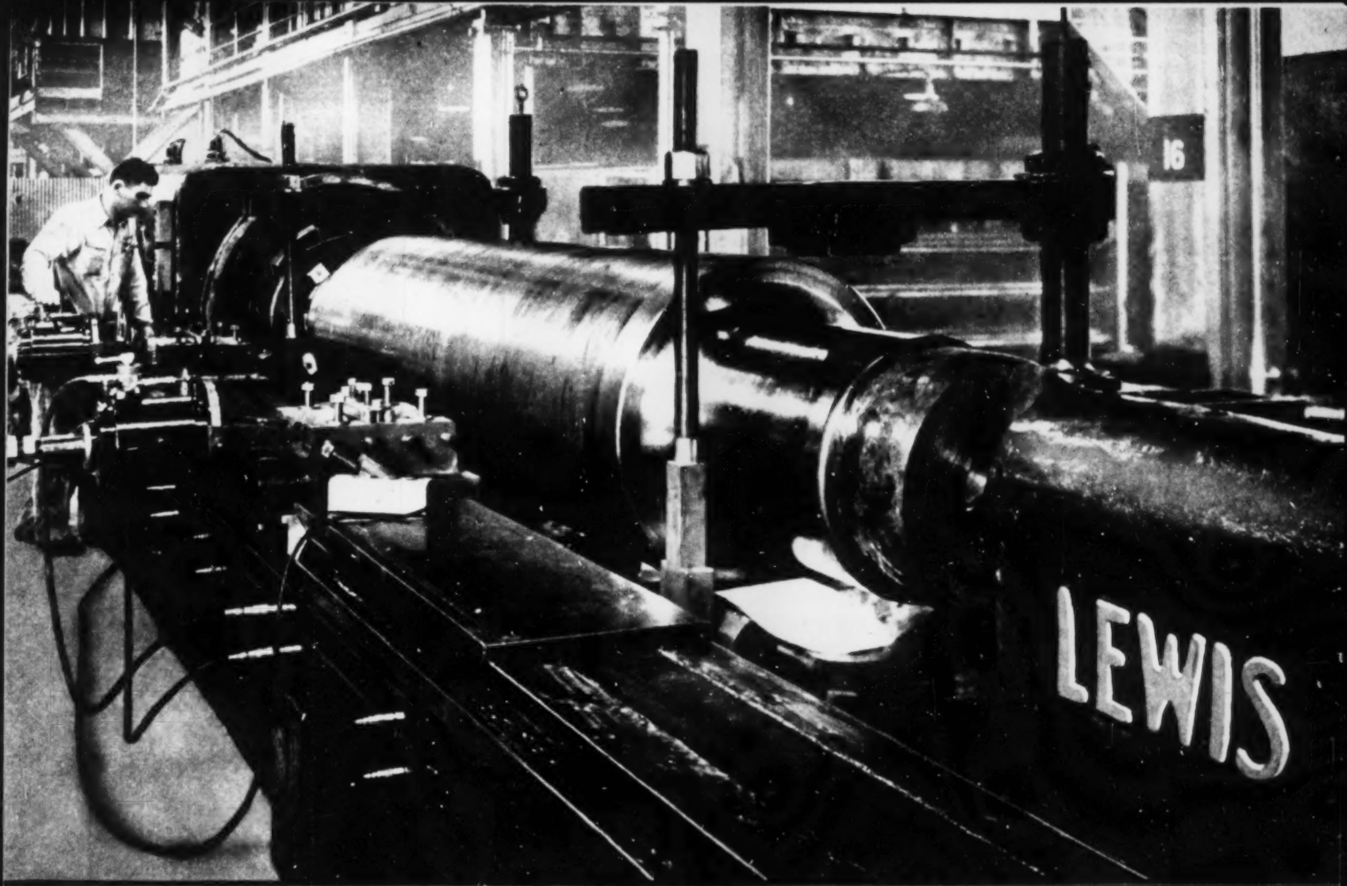
Where nonslip characteristics are essential, a rolled steel abrasive-impregnated plate is now available that retains strength-weight qualities of steel plate. Fabricating techniques related to plain carbon steel are applicable, but lack of ductility in the abrasive top layer prevents cold flanging with the abrasive in tension.

Safety: Sound Business—Industry's push on safety is spurred by realization that the effort is simply sound business practice. A worker today is about four times safer on the job than he is at home. Management recognizes that in improved morale, increased efficiency and enlarged productivity, safety programs pay attractive dividends. Only about nine industrial accidents were incurred for every 1 million man-hours worked last year.

Future safety factor improvement will depend largely on workers' mental attitude. Only about one out of ten accidents now is caused by failure of equipment or processes; the other nine can usually be traced to human error or disobedience of established practices.

Suspended Conditioners — Air conditioners are keeping up with efforts to provide better processing and working conditions. Soon on the market will be a suspended-type humidifier for industrial applications that require automatically-controlled humidification. The unit can be used for complete humidification, spot jobs in large

Flameproof suits on hazardous operations like this welding job are one reason safety is now largely a problem of worker attitude



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Depth of in-feed, lateral movements of cutting tool and movement of tail stock are all controlled by hydraulic pressure.

•

Tool traverses left to right and right to left producing a continuous spiral cut to any depth the tool will stand.

•

Predetermined hydraulic pressure eliminates wobble and reduces the shock that often ruins carbide-tipped tools. Also permits roughing-in of very hard surface rolls, formerly ground.

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Roll supported on adjustable neck bearings—eliminating the weight on centers.

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CAPACITY OF LATHE ILLUSTRATED—60 INCHES.

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areas, for boosting capacity of larger systems or precise laboratory control.

Another growing development is an oil mist precipitator to remove coolant oil mist and smoke emanating from high-speed cutting, grinding and other machining operations. A portable air mover proves useful for clearing fumes and sparks from welding work areas. The latter unit only weighs about 5 pounds, but in many cases does the job as effectively as it could be done with a permanent system.

Fighting Corrosion—Corrosion inhibition is being bolstered by several antirust paint preparations. One of these is an Epon resin mixture, giving good resistance to attacks by chemicals, gas fumes and moisture when applied to exterior steel structures. Preparation has resin base. Addition of a catalyst permits polymerization to take place at normal air-drying temperatures. Special gun developed to apply the inhibitor blends the feed and catalyst as the gun is fired, but before paint strikes the surface.

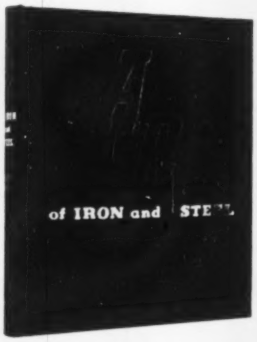
Where a product or structure does not operate under severe stress, surface impact or vibration, maintenance paints are available that require only removal of loose scale before application. Result is considerable savings by eliminating more difficult blasting work.

Selection of wetting and adhesion characteristics is important since little or no surface cavity is available. Surfaces have been found suitable for either adhesive or bonding-type coating.

Conversion Heat—Heating practice shows increased emphasis on gas burners and conversion installations. This is especially true in the heightened demand for interchangeable gas-oil equipment. Such provision in burners, particularly boilers and furnaces, prove valuable for areas where distribution of the two fuels is about equal, but supplies and prices fluctuate. Unit heaters are proving increasingly popular.

Better Lighting—Choice of a lighting system for a particular area depends primarily on nature of visual tasks performed. Both

This book was written by men you know and respect as "tops" in steelmaking . . .



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Here's how it works:

To use the Selector, all you need know is the characteristics that come with the job: type and condition of material to be worked, the number of pieces to be produced, the method of working, and the condition of the equipment to be used.

FOUR STEPS—and you've got the right answer!

1. Move arrow to major class covering application
2. Select sub-group which best fits application
3. Note major tool characteristics (under arrow) and other characteristics in cut-outs for each grade in sub-group
4. Select tool steel indicated

That's all there is to it!

Here's an example:

Application—Deep drawing die for steel

Major Class—Metal Forming—Cold

Sub-Group—Special Purpose

Tool Characteristics—Wear Resistance

Tool Steel—Airdi 150

One turn of the dial does it!

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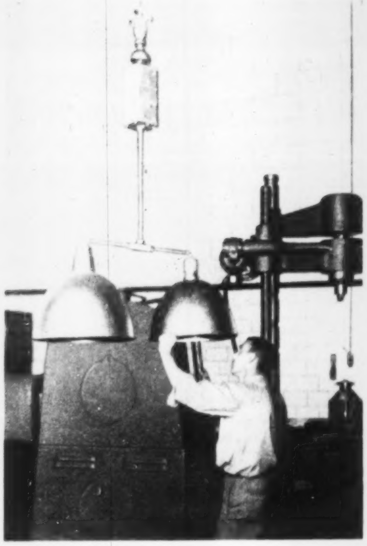
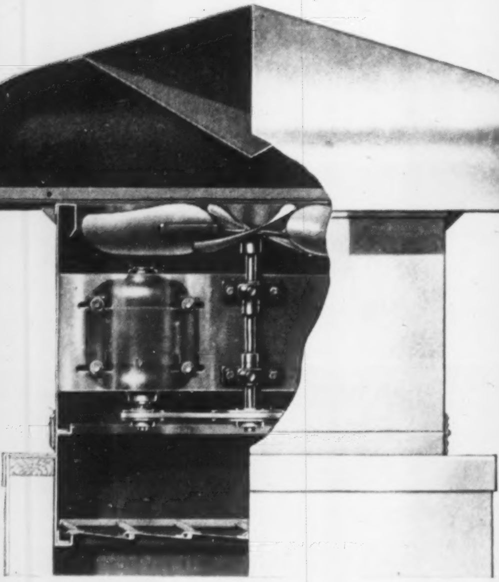
filament and mercury lamps are used individually in areas where mounting height exceeds 20 feet. A combination of these light sources produces adequate safety with reasonable color retention. Dust-tight units, reflectors with properly designed ventilation or use of the new high-bay industrial reflector lamps—either filament or mercury—are good examples of equipment that can reduce maintenance.

Now available is a lighting fixture that provides ample upward component of light output, with better shielding. At the same time, dirt accumulation may be actually reduced. Design is economical and it produces for the factory worker the same kind of eye comfort considered necessary for office personnel.



This Thompson Electric Co. pull-down type offers one method to speed and simplify lighting fixture maintenance

Lighting studies are finding colors important. So-called dynamic painting gives effective results with color. For example, critical or operating machine parts are given a color that comes quickly to the eye; stationary parts are made a relaxing green. Both are made different from material fabricated so worker avoids strain to see where work ends and machine begins. Plant walls are painted to work with, not against, lights



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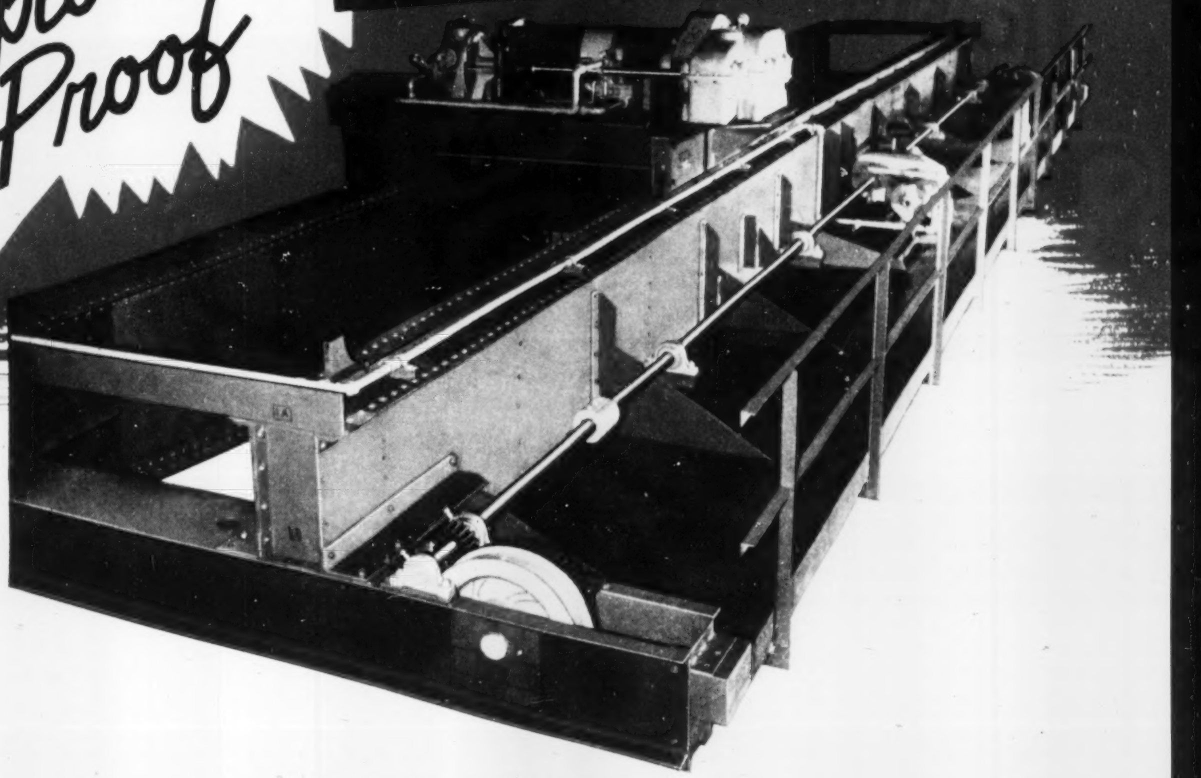

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while trucks and overhead moving equipment get high-visibility colors as safety precautions.

Sell Recovery — In more and more plants the critical eye is turned on the waste problem. Forging to the front is the idea that treatment of a waste to make it less harmful should be a last resort.

Key to a successful waste disposal program lies first in the plant being able to reduce the volume of the waste. Work on plating waste recovery points to the fact that recovery costs less than disposal. Three recovery methods are being used: Improved rinsing, evaporation, and ion exchange.

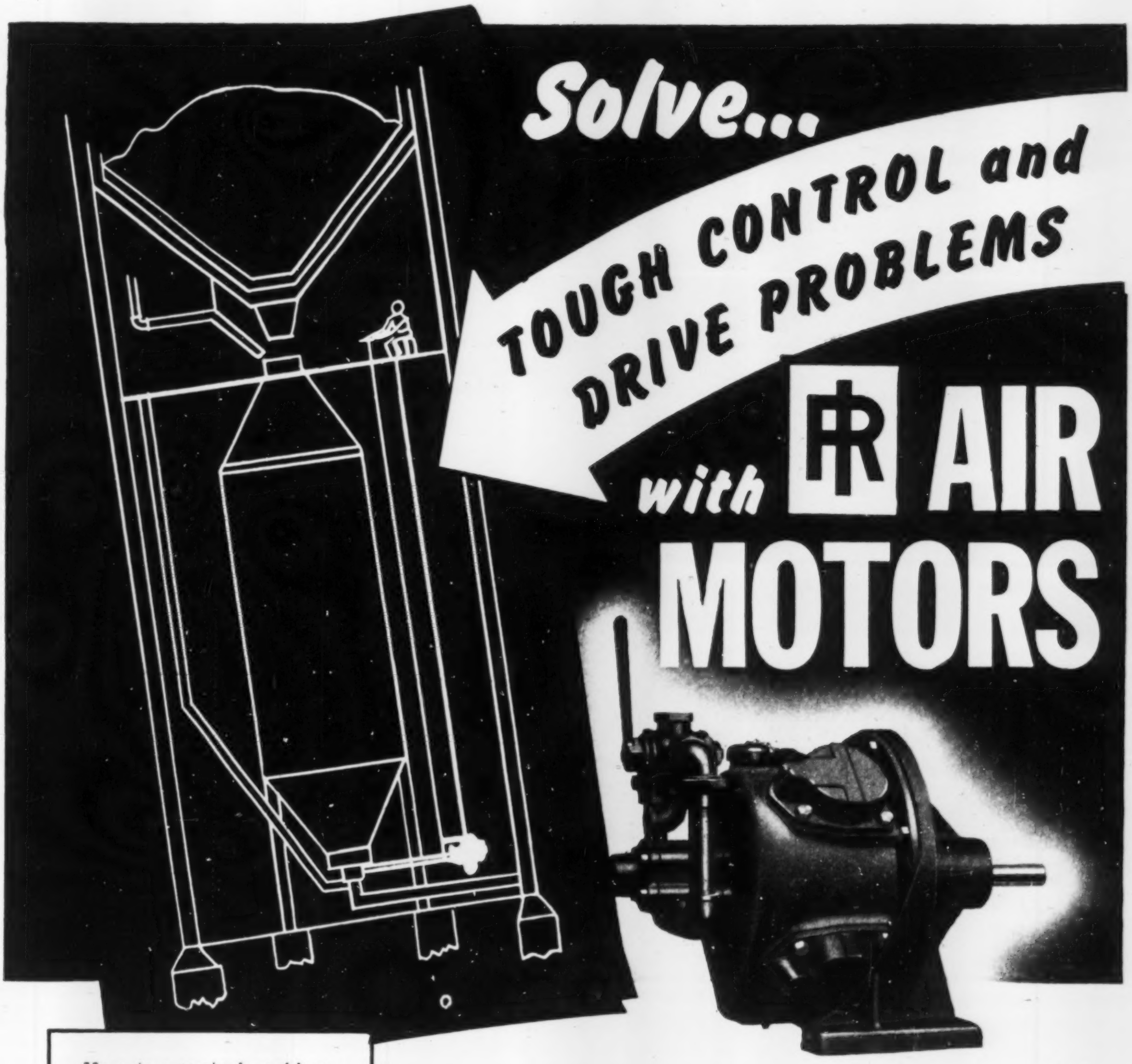
Continuous Disposal—For cyanide disposal, one plant's system is literally attached to the plating machine. The setup is used on an automatic zinc plating operation at General Motors' Delco Remy Division, Anderson, Ind. Cyanide is chlorinated as soon as it becomes waste by alkali-chlorination in the rinse tank. Treatment is continuous by constantly recirculated water in the tank. This makes it unnecessary to discard batches and cuts downtime.

Integrated Treatment — Where two wastes must be treated, economies sometimes result when one is used to balance the other. General Motors' New Departure Division takes advantage of this integrated method. The plant treats an emulsion containing about 2300 ppm soluble oil and 650 ppm insoluble oil, plus a waste containing chromic and sulphuric acids.

Waste pickle liquor is used to crack the emulsified soluble oil, reduce chromates and aid in final clarification. Final effluent contains 10 to 20 ppm soluble oil and chromium trace of 0.6 ppm.

Lagooning — At Salisbury Axle Works, Ft. Wayne, Ind., all waste other than nontoxic and storm flows by gravity to a detention basin for sedimentation and oil separation. Soluble oil and much emulsified oil is removed to obtain an average 144 ppm oil content for first basin effluent. This is compared with influent readings of 735 to 1800 ppm.

From the first basin effluent discharges through a siphon into the 35-acre basin number two.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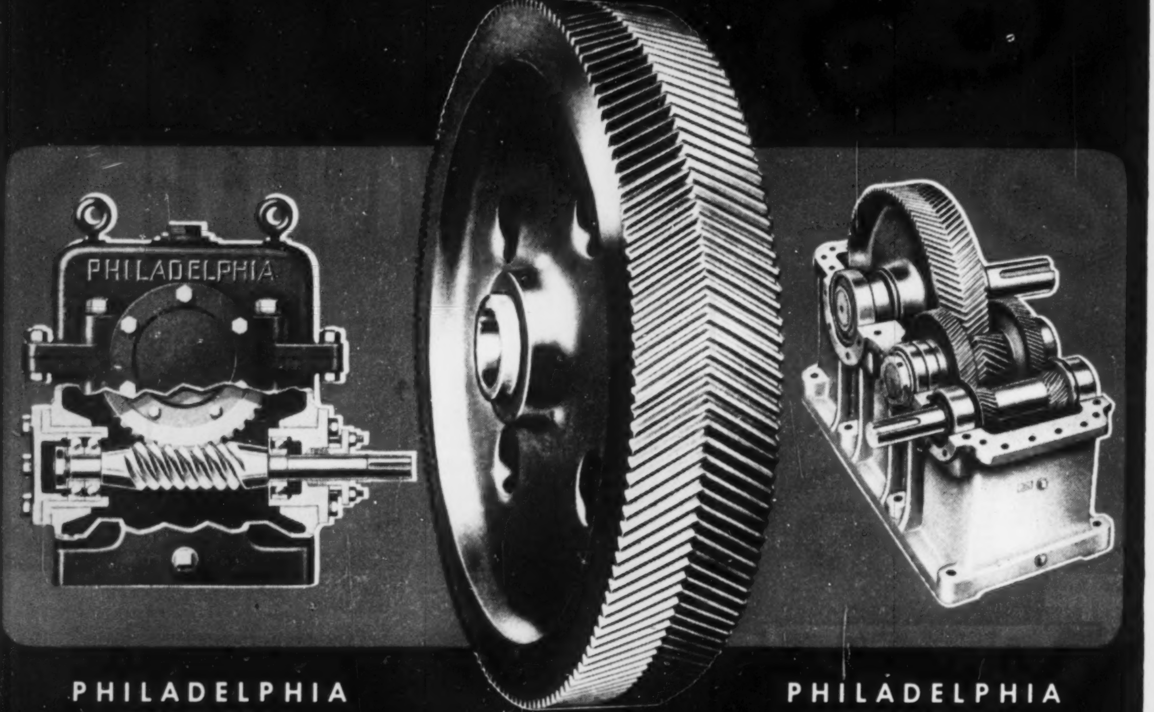

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What Happened
IN METALWORKING

JANUARY

Jan. 1—Business experts forecast a $55.5 billion tax burden in 1952 in contrast with $50 billion in 1951. Employment, expected to be high all year, may reach 63 million. New car models have minor design changes. Popular prosperity may cause Washington scandals to have little effect on the November presidential election.

Jan. 4—Republic Steel Corp. and Armco Steel Corp. acquire jointly an additional 15 per cent interest in the Reserve Mining Co., giving each a 50 per cent ownership.

U. S. Steel Co. announces it will install a third turbo-blower at the Youngstown works. The cost may be $2 million.

Jan. 6—Reynolds Metals Co. issues a letter of intent to C. F. Braun & Co., Alhambra, Calif., for engineering and construction of a $42 million alumina plant in San Patricio county, Tex.

Jan. 7—NPA modifies the Controlled Materials Plan, abolishing controls on delayed deliveries of controlled materials. NPA tells manufacturers they cannot use more steel, copper and aluminum in any quarter beginning Apr. 1 than allotted for that quarter.

The Department of Labor estimates work stoppages cost fewer days in 1951 than in any other year since World War II. Man-days lost by work stoppages dropped from 38.8 million in 1950 to 22.6 million in 1951.

Jan. 8—Allegheny Ludlum Steel Corp. buys a 160-acre site on the Allegheny River near Freeport, Pa., for future expansion.

Willys-Overland Motors Inc. completes reactivation of the $14 million government-owned aluminum forging plant in Erie, Pa.

Employment, Production High

Jan. 9—President Truman's State of the Union message cites 61-million employment, production 8 per cent above 1950.

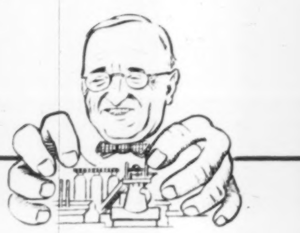
Jan. 10—Defense Production Authority announces civilian production will be cut back in second quarter on homes, automobiles and appliances.

Marlin-Rockwell Corp., Jamestown, N. Y., will soon start construction of a $3 million super-precision bearing plant in Falconer, N. Y.

Jan. 12—West Germany ratifies the Schuman plan for a six-nation

President Truman assures Philip Murray that Taft-Hartley won't be invoked

Senators urge the President to unwrap the Taft-Hartley Act, end steel strike



President Truman directs government to seize steel mills, as strike begins

1952 Steel Strike: Blow by Blow Account

The 1952 steel strike had its origin in October, 1951, when Philip Murray, CIO Steelworkers' president, first sounded warnings that his union would ask sizeable pay increases when their contract expired, Jan. 1, 1952. Wage talks between the union and steel companies became stymied in December, 1951, and federal mediators attempted to resolve the disagreements. On Dec. 17, Philip Murray said a nationwide steel strike beginning Dec. 31 "appears inevitable," but President Truman "persuaded" Mr. Murray to postpone the strike until the Wage Stabilization Board had reviewed the controversy.

Jan. 3 A steelworkers union meeting defers the planned strike to Feb. 23.

Jan. 7 WSB's six-man panel begins hearings in Washington on the question of pay increases for steelworkers.

Feb. 1-16 Steel talks are resumed in New York.

Feb. 21 Steelworkers postpone their strike to Mar. 23, as WSB talks continue.

Mar. 19 Through industry members of WSB, steel companies offer the union 13.7¢ an hour more.

Mar. 20 WSB recommends that steel workers get 17.5¢ an hour increase, fringe benefits amounting to 5¢ an hour and the union shop. The union postpones its strike until Apr. 8, as steel companies object that no steel price raises are included.

Mar. 30 Charles E. Wilson, Defense Mobilization boss, resigns after dispute with President Truman about steel prices. Mr. Truman had said WSB proposals were "by no means unreasonable." Mr. Wilson says Mr. Truman's policies were by all means unreasonable.

Apr. 3 Steel companies offer union men a full 16 cents an hour increase. This is refused, largely because it provides for no union shop. That issue is becoming the major stumbling block in negotiations.

Apr. 4 Mr. Murray says a steel strike will begin at 12:01 a.m., Apr. 9, as talks collapse.

Apr. 8 Production stops in steel mills before the strike deadline.

President Truman orders seizure of steel mills. In an address he claims that WSB recommendations were fair and reasonable. He cites a $19.50-per-ton "profit" by steelmakers.

Apr. 9 Clarence B. Randall, president of Inland Steel Co., points out that Truman's profit figures occurred before taxes, which wipe out two-thirds of the profit. He says WSB proposals will amount to 30¢ per man-hour in extra costs.

Steel companies request a temporary injunction of the seizure. This is refused. They then appeal seizure to courts.

Federal District Court Judge David A. Pine hears arguments for injunctions against seizure.

Apr. 29 Judge Pine in Federal District Court, Washington, rules the President was without power to take over steel mills. Mills are to revert to owners, as seizure order of Apr. 8 is illegal.

Philip Murray notifies union members to leave their jobs in steel mills.

coal and steel pool in free Western Europe.

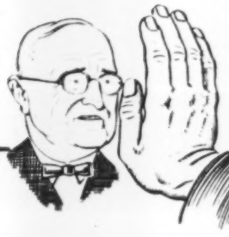
Jan. 14—Pittsburgh Steel Co., with the goal of expanding its productive capacity 50 per cent, installs a 66-inch high lift blooming-slabbing mill.

Jan. 15—Youngstown Sheet & Tube Co. awards a contract to United Engineering & Foundry Co. for a 56-inch tandem cold rolling mill and two skin pass mills for its Indiana Harbor, Ind., works.

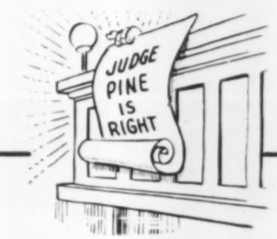
Ground has been broken for the new $7.5 million plant of Delco Products Division, General Motors Corp., near Dayton, O.

The Office of Defense Mobilization announces deliveries for the defense program are currently triple what they were at the end of 1950. Defense production is nearly $2 billion a month.

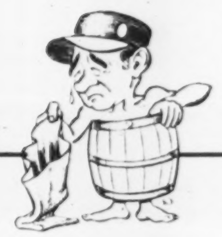
Jan. 16—U. S. Steel Corp. awards Bechtel Co. a general contract for construction of mining facilities in Venezuela, including a 90-mile railroad and highway.



Federal District Court Judge David A. Pine rules against presidential action



Supreme Court agrees with Judge Pine, rules seizure to be unconstitutional



All parties hard hit by strike, workers lament wage losses averaging $637

May 2—Mr. Murray calls off the strike as the government asks the Supreme Court to review Judge Pine's decision.

June 2—The Supreme Court by 6-3 decision upholds Judge Pine's decision. Associate Justice Hugo Black writes majority opinion that seizure was unconstitutional.

June 3—Some 650,000 steelworkers begin leaving their jobs.

Steel shipments are banned by the government from warehouses to manufacturers of civilian products, in order to conserve steel for defense.

June 5—Officials of the six major strike-bound companies resume wage negotiations at Washington.

June 9—Senators call on President Truman to invoke the Taft-Hartley law to end the strike.

June 13—Ford Motor Co. announces it will be forced to close plants in two weeks unless the strike is settled.

June 16—Shipping operations come to a standstill for lake iron ore carriers due to a "sympathy strike" by ore miners.

June 17—Steel users generally still have two weeks' inventories but expect to feel a pinch in early July. International Harvester Co., Chicago, will have to cut production, and auto manufacturers also plan shutdowns. Defense work may be hit hardest, as steels needed for defense have been short all year.

June 22—In a speech at Gary, Ind., Philip Murray discloses that President Truman promised him, if he would postpone a strike, he would have no fear of the administration's imposing the Taft-Hartley injunction procedure. The occasion referred to in Mr. Murray's address was a telephone conversation with the President previous to the planned Jan. 1 strike.

June 27—Pittsburgh Steel Co., fourteenth largest steel producer in the U. S., signs an agreement with the CIO, becoming first leading steel producer to sign with the union. Scattered companies follow, granting sizeable increases to workers.

July 24—The six largest steel producers and CIO steelworkers reach agreement on important basic issues. The strike is over following a White House meeting between industry and union leaders. Agreements call for a very modified union shop, wage increases of about 16c an hour and additional benefits of about 5.5c an hour. The economic concessions are approximately what the industry offered workers before the strike began.

Defense Secretary Robert A. Lovett says it will require three to six months for defense production to recover from the strike. He characterizes damage as greater than any bombing attack could be. Production schedules may be off 20 per cent this year.

Authorities estimate costs of the strike to be $637 in lost wages per steelworker, $4 billion to the economy in lost sales and wages, and 15.3 million tons of ingot production lost.

Steel will receive new price increases from OPS of $5.20 a ton.

July 26—Steel production for last week was 15.3 per cent of capacity.

Military Takes Third of Output

Jan. 17—President Truman says over one-third of metalworking industries' output will go to military uses in 1952.

Prime Minister Winston Churchill asks U. S. for steel, not gold, in speech before both houses of Congress.

Jan. 19—U. S. agrees to allocate to England 800,000 tons of steel. In return the United Kingdom will give or allocate 27,000 tons of aluminum and 20,000 tons of tin in 1952. Furthermore, England will be allowed 200,000 tons of steel scrap and pig iron.

Jan. 21—Construction Aggregates Corp. of U. S. drains and dredges a lake to uncover a rich iron ore deposit under the bed, near Atikokan, Ont.

The Commerce Department reports that national income rose to an annual rate of $278 billion. Corporation profits after third-quarter taxes were at $16 billion.

Bethlehem Pacific Coast Steel

Corp., operating at 106 per cent of capacity in 1951, turned out 830,846 net tons of ingots at three plants—32 per cent higher than the best previous year, 1950, the company reports.

Copper Shortage Looms

Auto builders are faced with a critical shortage of copper. They have the steel and aluminum to assemble 930,000 cars next quarter, they say, but copper shortage may slash production to 800,000. DPA says the lack of copper is the greatest limiting factor for all second quarter production.

Jan. 22—President Truman's budget report asks a tax increase of $5 billion. Total budget would reach $85.4 billion, with an estimated deficit of $14.4 billion. The budget would go into effect for fiscal year beginning July 1.

More finished steel was shipped in the first eleven months of 1951 than in any other complete year, the American Iron & Steel Institute says. The total was 72,491,400 net tons for eleven months.

Jan. 24 — The Canadian dollar reaches a level with the American dollar, and begins to pass it. Financial experts point to sound fiscal policies of Canadian government.

Jan. 25—Copper shortage in the U. S. may be relieved by agreement with Canada whereby Canada will ship 79,100 tons of copper to the U. S. this year, or about 16,000 tons more than in 1951.

Jan. 29 — NPA drops allocation controls on chrome stainless steel because output exceeds current demand.

Improved supplies of scrap, critical during early January, aid U. S. Steel to reopen five blast furnaces.

FEBRUARY

Feb. 4 — The American Iron & Steel Institute says the steel industry will spend about $1.3 billion on expansion in 1952.

Feb. 5—Republic Steel Corp. enters the billion dollar company class. Total sales and operating revenues in 1951 were $1060 million.

CANADIAN DOLLAR LEADS
. . . economy pays in Canada

Restore Nickel Plant

Feb. 7—The Nicaro Nickel plant, a giant Cuban plant owned and operated by Cubans and Americans, is back in operation and should produce about 30 million pounds of nickel annually.

Feb. 9 — Ohio Manganese Inc., Youngstown, receives a certificate of necessity granting it permission to amortize 80 per cent of the cost of a new manganese extraction plant. Plant will use open-hearth slag.

Inland Steel Products Co., Milwaukee, is undergoing a $2.5 million expansion which will add 40 per cent more floor space to present facilities.

Feb. 11—The automobile industry is told it will get 1 million extra pounds of aluminum in the second quarter. Supplies had been tight.

Bethlehem Steel Corp. is spending $65 million developing iron ore properties near Morgantown, Pa.

Feb. 12—Because of slackening demand for silicon steel, Allegheny Ludlum Steel Corp. cut back operation of electric furnaces at Brackenridge, Pa., from 20 to 15 turns a week.

Reynolds Metals Co. plans an expansion of facilities at Listerhill, Ala., at a probable cost of $2 million.

DPA Boosts Steel Allotments

Feb. 14—DPA increases allotments of steel, copper and aluminum to civilian industries for the second quarter.

Feb. 17 — American Institute of Steel Construction predicts fewer jobs and unused plant capacity unless more steel is released for construction programs.

Feb. 18—Precision Castings Corp. opens a die casting plant in Chicago.

In Quebec City, Que., reports say a single furnace electrically-operated iron ore refinery with a yearly capacity of 13,200 net tons of pig iron will be built by the end of 1953.

Feb. 19—Bethlehem Steel Corp. is planning to build within the next two years two of the largest tankers ever constructed. They will be 700 feet long, to weigh 45,500 tons.

Taconite Project Planned

Feb. 20 — Erie Mining Co. will spend $300 million on a Minnesota project to furnish 10.5 million tons of iron ore pellets annually from taconite. A plant will be built near Aurora, Minn.

Feb. 22—Babcock & Wilcox Co., New York, starts construction on a plant in Paris, Tex., the third new plant announced by the company within a year.

Feb. 25—Initial work is underway on a new steel plant for Tennessee Steel Corp. at Oneida, Tenn. Annual capacity for new steel will be 192,000 tons.

Feb. 26—Solar Aircraft Co. receives a new $13 million order for manufacture of jet engine parts, to be made at its new plant in Des Moines, Iowa.

Bethlehem Maps Expansion

Feb. 28 — Bethlehem Steel Corp. expects to spend $289 million on new plants and facilities soon. Another million net tons of ca-

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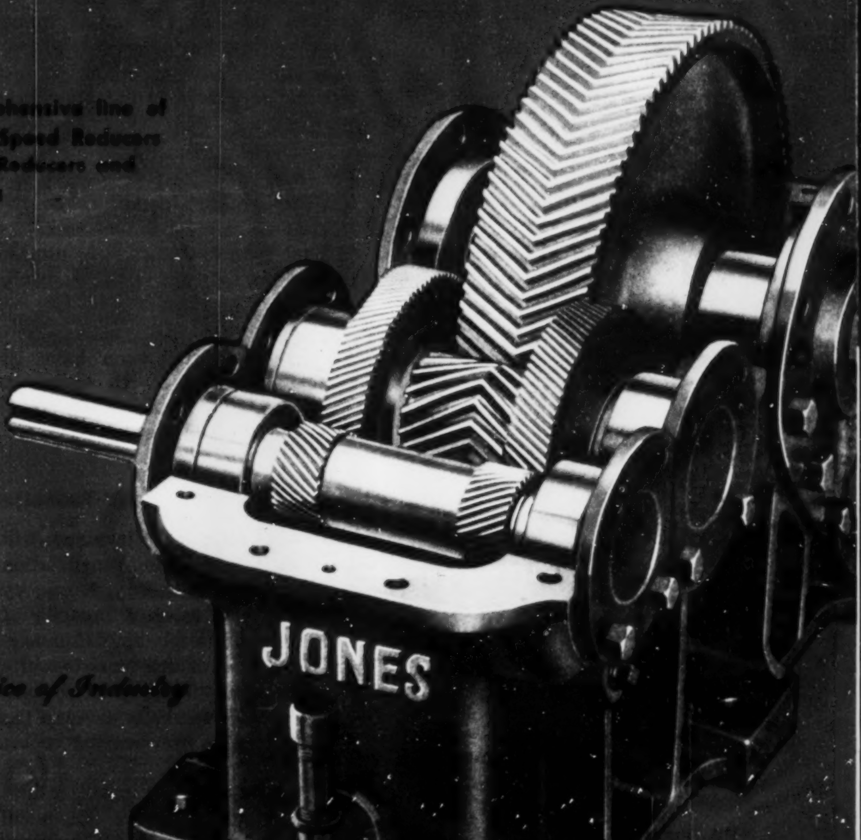

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ENGINEER SHORTAGE
. . . a year-round problem

pacity may be added in the first half of 1952, and Bethlehem's capacity at the end of 1953 is expected to be 18.4 million tons.

Feb. 28—DPA says that steel controls can be substantially relaxed toward the end of this year.

Feb. 29—NPA will increase steel allotments for first quarter use an additional 10 per cent for many manufacturers.

The U. S. signs a contract with Falconbridge Nickel Mines in Toronto, Canada, promising to purchase 50 million pounds of nickel produced in Ontario within the next nine years. Contract includes purchase of 1.5 million pounds of cobalt.

MARCH

Mar. 1—DPA announces certificates of necessity for a number of new projects including one to Bethlehem Steel Corp. for $38 million for production of coke and pig iron at Sparrows Point, Md., another to Jones & Laughlin Steel Corp. for Pittsburgh coke ovens at an estimated cost of $22.9 million, and another to U. S. Steel Corp. for coal production at Uniontown, Pa., at an estimated cost of $8.3 million.

NPA makes an additional 70,000 tons of structural steel available for commercial and industrial construction in the second quarter.

National Malleable & Steel Castings Co., Cleveland, has purchased all capital stock of Capitol Foundry Co., Phoenix, Ariz., and its subsidiary, Arizona Iron Works. A $1.5 million program will improve and expand the Phoenix properties.

Mar. 2—DPA issues the largest single list of fast write-offs since mobilization. Some 587 certificates are granted for projects involving a proposed investment of $958 million during the period from Feb. 16 to Feb. 29. Among grants allowed were those to North American Steel Co., Clinton, Iowa, to write off 85 per cent of $66.5 million, and to Union Carbide & Carbon Co., Marietta, O., for 65 per cent of $16 million.

Mar. 4—NPA ends restrictions on the use of lead, now allowing consumers to increase inventories to a sixty day supply.

DPA boosts metal allocations to civilian industry for second quarter by 30 million pounds of aluminum and 25 million pounds of copper, as supplies of critical metals improve.

The American Iron & Steel Institute reports production of boron-treated alloy steel ingots was 70,077 net tons in January, or almost two and a half times the monthly production in 1951.

Mar. 5—Iowa will soon have its first steel plant. North American Steel Co. plans to start construction within one month.

Three Companies Seek Taconite

Reserve Mining Co., Cleveland, will expand its taconite beneficiation program at Beaver Bay, Minn., by 50 per cent to reach a capacity of 3,750,000 tons annually. Commercial quantities of ore from taconite are expected by 1955, as three companies are at work to develop the Mesabi Range's iron-bearing rock.

The second of eight new potlines at Kaiser Aluminum & Chemical Corp.'s Chalmette, La., primary aluminum plant begins production.

Mar. 6—The $65 million expansion program of Kaiser Steel Corp., Fontana, Calif., will include a third blast furnace and a ninth open hearth at its Fontana facilities.

Mar. 7—Globe Iron Co., Jackson, O., will begin building a $2 million ferroalloy plant near Beverly, O.

Mar. 8—Shortage of scrap at steel mills is serious. The Erie Railroad Co. announces it will contribute 11 locomotives to the scrap drive.

Allis-Chalmers Mfg. Co., Milwaukee, will build a giant crusher for use at Reserve Mining Co.'s taconite plant to be built at Babbitt, Minn.

Mar. 9—General Fireproofing Co., Youngstown, will begin construction of a large plant addition on May 1, to house about $1 million worth of equipment.

MILLIONS INTO ATOMS
. . . fortunes for U. S. research

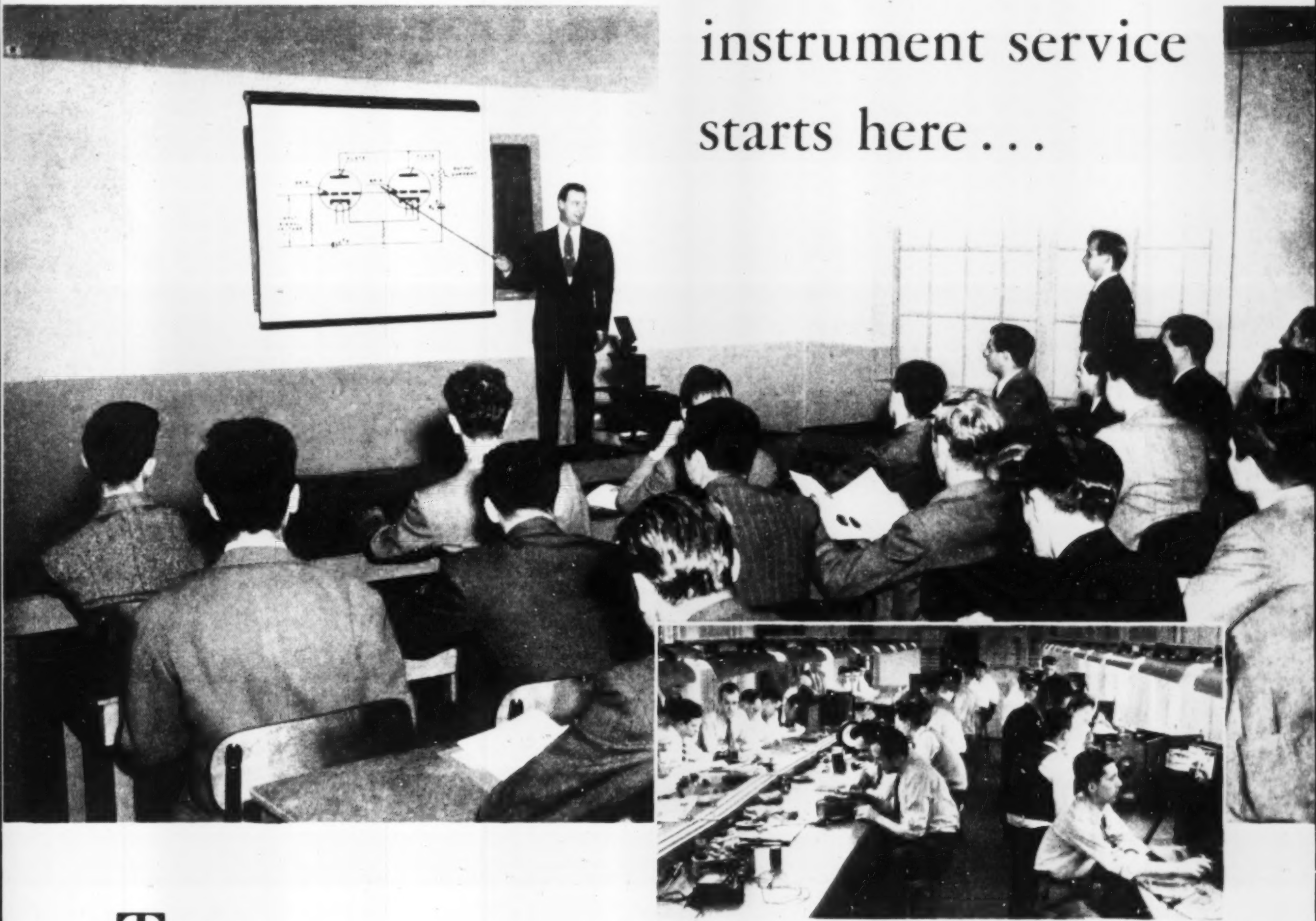
A $15 million plan to expand the Springfield, Ill., works of Allis-Chalmers Mfg. Co. will be undertaken before summer, adding over 300,000 square feet of space for production of tractors and motor graders.

Mar. 11—Kaiser Frazer Corp. President Edgar Kaiser says facilities at Willow Run, Mich., will be divided equally between civilian and military production during 1952.

Mar. 12—Tin plate manufacturers are asking extra material allotments for the second quarter. Some mills may be forced to lay off skilled workmen unless NPA lifts quota limitations.

Mar. 17—The Electro Metallurgical

Your Honeywell instrument service starts here...



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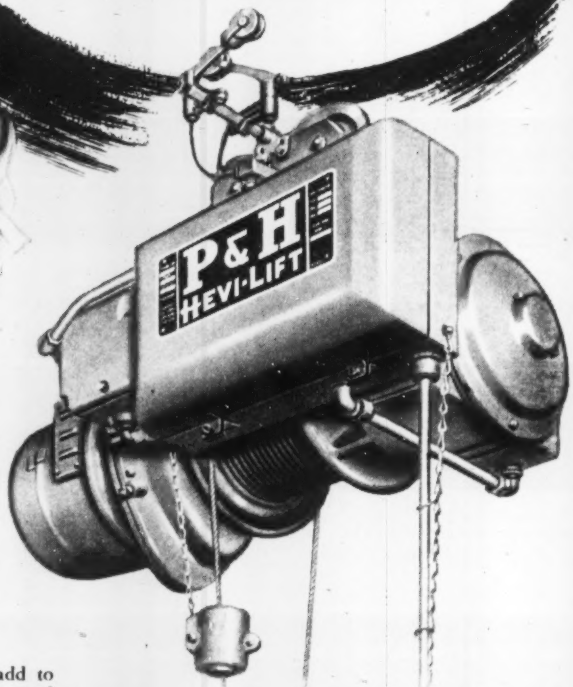
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handle them "THRU-THE-AIR"

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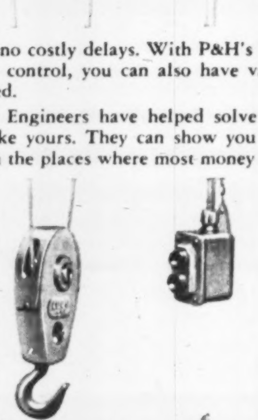

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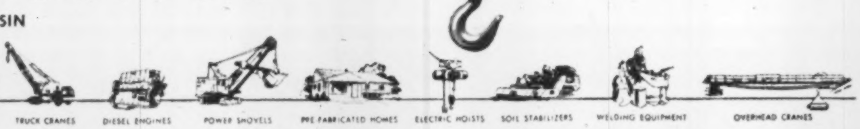
the **P&H** *Line*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OVERHEAD CRANES

Division of Union Carbide & Carbon Corp., New York, plans electrolytic manganese output at a new plant in Marietta, O.

Mar. 19—Turner Construction Co., New York, has received a contract from White Pine Copper Co. for development of a copper project at White Pine, Mich., at an estimated cost of $57 million. The project will include development of mine tunnels and a mill to process 10,500 tons of ore daily.

Mar. 22 — NPA authorizes warehouse distributors of steel to make deliveries on second quarter allotments immediately, in order to allow distributors more time to process orders for steel products.

DPA sets an electric power expansion goal of an additional 32 million kilowatts of domestic generating capacity to be reached by the end of 1954.

Mar. 24—Net earnings of 808 major corporations dropped 12.3 per cent in 1951. Tax bills are blamed.

Aluminum producers begin to worry about a concerted bid for business in the U. S. by Aluminum Co. of Canada Ltd.

Lake Shipping Season Begins

Mar. 25—First Great Lakes shipments begin, as cars are shipped out of Detroit. Ore carrying is expected to begin by Apr. 6.

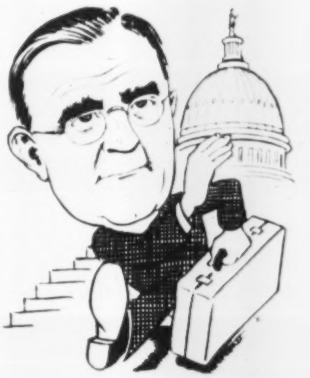
Mar. 30—Defense Mobilizer Charles E. Wilson resigns and Dr. John R. Steelman is named temporary director of defense mobilization. (See steel strike chronology, p. 464).

Tungsten Output Climbing

Mar. 31—Free world production of tungsten in the second quarter of 1952 will be 20 per cent above first quarter output, International Materials Conference reports.

Reynolds Metals Co. plans a $30 million aluminum reduction plant at Gum Springs, Ark.

Anaconda Copper Mining Co. begins construction of a $40 million ore concentration plant at Yerington, Nev.



MOBILIZER WILSON RESIGNS
. . . challenges Truman's actions

APRIL

Apr. 1—A "little controls plan" is taking shape within the big Controlled Materials Plan. Its function: To assure that vital defense production can still get priority of materials in the event that CMP is discarded. Pressure is growing for release of controls by fourth quarter. Washington reports indicate a majority in Congress is eager to drop controls as soon as they're no longer necessary. This may occur in late fall, barring a steel strike.

With the aid of U. S. financing, the Royal Dutch Blast Furnace & Steel Co., Ijmuiden, Holland, will increase steel rolling capacity of the free world by almost 500,000 tons a year. The plant is now in operation.

Christiansen Corp., Chicago, a producer of aluminum and magnesium, forms a subsidiary, Titanium Co., to located in East Chicago, Ind.

GM Lands Army Contract

Apr. 3 — General Motors Corp.'s Cadillac tank plant in Cleveland receives a $165 million Army contract for light tanks and motor gun carriages.

Apr. 6—Bethlehem Steel Corp.'s Lackawanna, N. Y., plant lights its seventh blast furnace, expected to increase steel ingot capacity at Lackawanna by 1,140,000 net tons this year.

Apr. 7—Allis-Chalmers Mfg. Co. will begin a $3 million building

P&H OVERHEAD CRANES

Electrically Better, Too!

Structural strength? You can take that for granted. But look closely to the electrical equipment. That's the important factor in overhead crane service. That's why P&H builds its own electrical equipment — designed exclusively for crane operation, not adapted for it. Experience is the reason for P&H leadership — experience in building and servicing more than 18,000 electric cranes — far more than any other. You make no mistake when you let P&H build the entire crane — and take the complete responsibility for service.

P&H MAGNETORQUE® AC Crane Control provides the finest known speed-load characteristics.

Write for Bulletin C-6

P&H OVERHEAD CRANE DIVISION
HARNISCHFEGER CORPORATION
MILWAUKEE 46, WISCONSIN

project soon at its La Porte, Ind., tractor division.

Apr. 8—DMPA advances nearly $4 million to Westmoreland Manganese Corp., Batesville, Ark., to boost U. S. production of manganese.

Pittsburgh Steel Co., Pittsburgh, is ready to step up production following a $60 million expansion program.

Apr. 10—General Motors Corp.'s GMC Truck & Coach Division is awarded a contract for $115 million to build two-and-a-half-ton Army trucks.

AEC Plans Uranium Project

Apr. 11—Atomic Energy Commission discloses it wants to build a new $1 billion plant to make uranium-235, a key substance in atom bombs. Sites in the Ohio River valley are being considered for the plant.

Apr. 14—The American Iron & Steel Institute announces that U. S. metal producers turned out 1425 pounds of ferrous and nonferrous metal for every person in the nation during 1951.

Apr. 15—Precision tubing for defense will be produced at a $4 million plant planned by Shenango-Agaloy Tube Co., Youngstown.

Erie Mining Co., Aurora, Minn., receives from DPA a certificate of necessity and write-off on 75 per cent of $298 million for new taconite facilities in Minnesota.

DPA approves production of 296,000 freight cars between Jan. 1, 1952 and Jan. 1, 1954.

Apr. 16—NPA announces it will boost the "self-certification" allowance of steel, copper and aluminum for school and road construction in the third quarter of this year.

Nondefense Work Increases

Apr. 17—NPA reports it has approved two and one-half times as many commercial, religious and community building projects for the second quarter than for the first quarter of this year.

Apr. 21—Equipment for producing steel sections by the Ugine-Sejournet hot extrusion process is on order for Jones & Laughlin Steel Corp.'s Pittsburgh works.

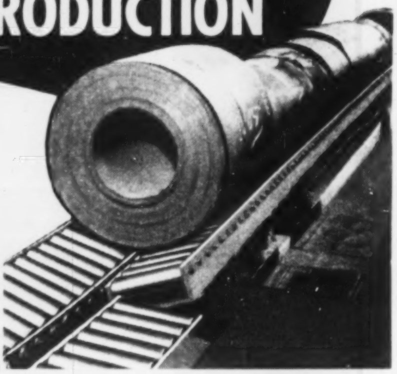
Apr. 22 — General Electric Co., Schenectady, N. Y., will construct a 90,000-square-foot plant at Edmore, Mich., for construction of permanent magnets used in radar, radio and television receivers. Production will begin about May 1.

Apr. 23—American Smelting & Refining Co., New York, announces the start of a $75 million copper mining project in Peru.

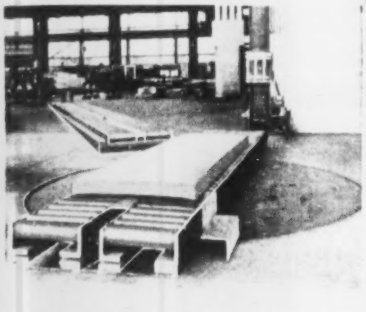
Apr. 25—The American Institute of Steel Construction reports that March shipments of fabricated structural steel totaled 271,085 tons, a 10 per cent increase over the previous month's 246,398 tons.

Allegheny Ludlum Steel Corp., Pittsburgh, reports incoming orders have steadied in the past eight weeks after a sharp decline. The drop had resulted in cuts in pro-

1953 TECHNIQUES THAT *SPEED* PRODUCTION

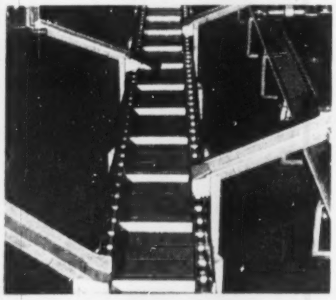


COILS OF STEEL—weighing as much as 30,000 pounds—are handled quickly in a large eastern steel mill on this A-F *Engineered* Completely Coordinated Conveying System. An A-F Tilter discharges coils *automatically* from conveyor. Many other features speed up work of stacking and distributing sheets.



THIS A-F ROLLER CONVEYOR mounted on a powered turn-table distributes stacked sheet steel to the many work bays in this modern steel plant—easier and faster.

For information regarding latest, most efficient methods of handling metal products, coils of steel, stacked sheet steel and metal scrap salvage—write today.



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An A-F Pan Type Overlapping Beaded Apron Conveyor takes scrap (via slides) directly from stamping presses and conveys it to a long A-F Reversing Conveyor of similar construction which discharges scrap into either railroad cars at one end or trucks at the other.

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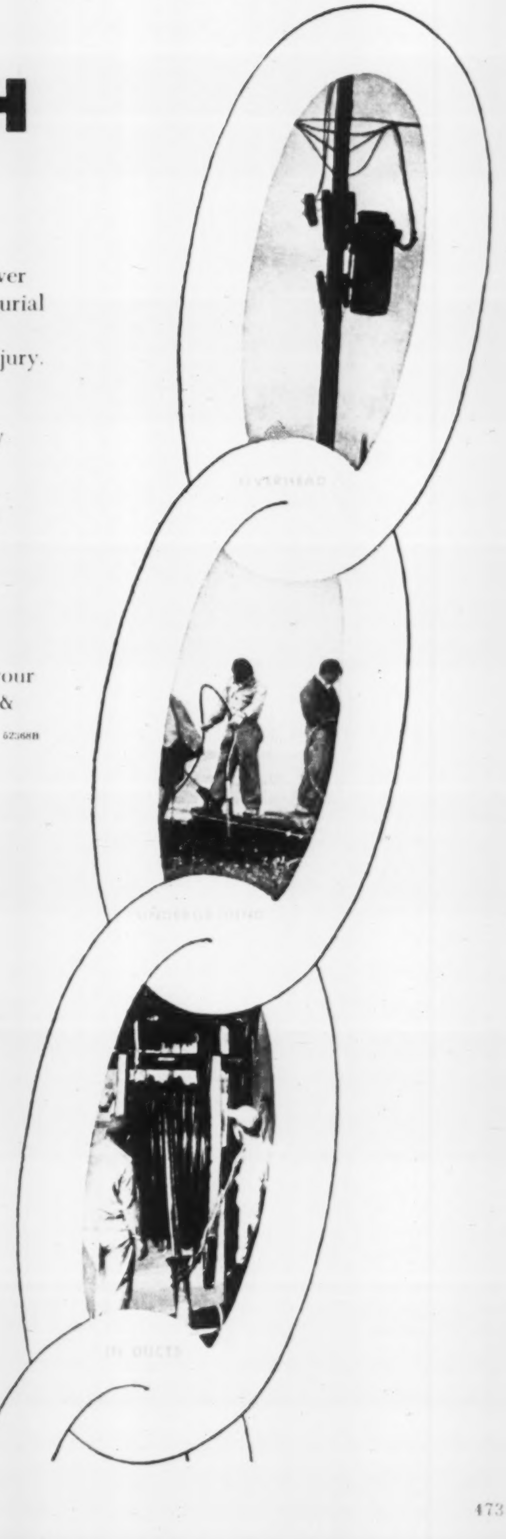

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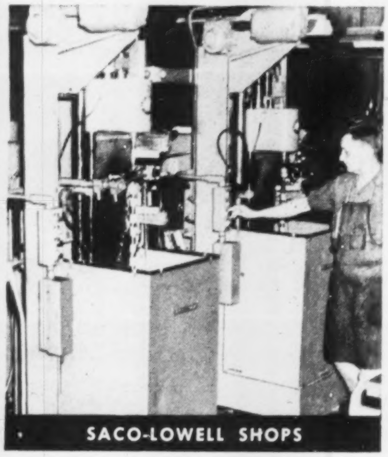

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duction, corporation officials say.

Record Blast Furnace Output

Apr. 27 — The American Iron & Steel Institute reports a new monthly record for blast furnace production was set in March. Output rose to 6.3 million net tons from a previous high of 6.2 million net tons in October, 1951.

Apr. 29 — General Motors Corp. blames a March decline in sales and earnings on government restriction of auto production.

U. S. Steel Corp.'s steel shipments in the first quarter were the largest for any quarter in the corporation's history, but net income slipped due to heavy taxes.

Apr. 30—Curtiss-Wright Corp.'s metal processing division, Buffalo, has plans for expansion of its plant. The program will cost between $5 million and $10 million.

CONTROLS IRKSOME
. . . *industry chafes at bit*

Bennett S. Chapple Jr., assistant executive vice president of U. S. Steel Co., announces that the steel industry is working on a plan which will lead to complete decontrol of steel distribution. The proposal will probably recommend that the ticket system be progressively abandoned, freeing consumers to use the available steel as they wish.

MAY

May 1—NPA says the supply of nearly all basic materials has eased since Mar. 1. Only nickel, cobalt

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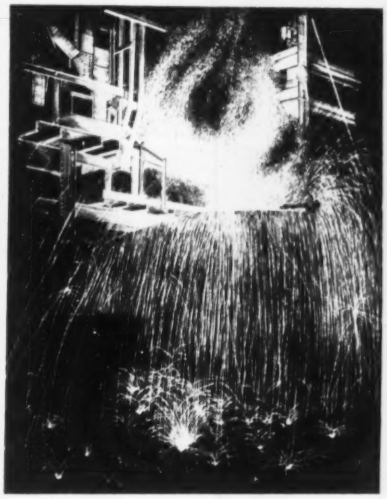

BAKER'S MAGDOLITE is a dolomite of superior chemical, physical and mineralogical composition, whose properly burned, grain-size particles will help you get more uniform ingots, at lower fuel costs, with less defective production material.

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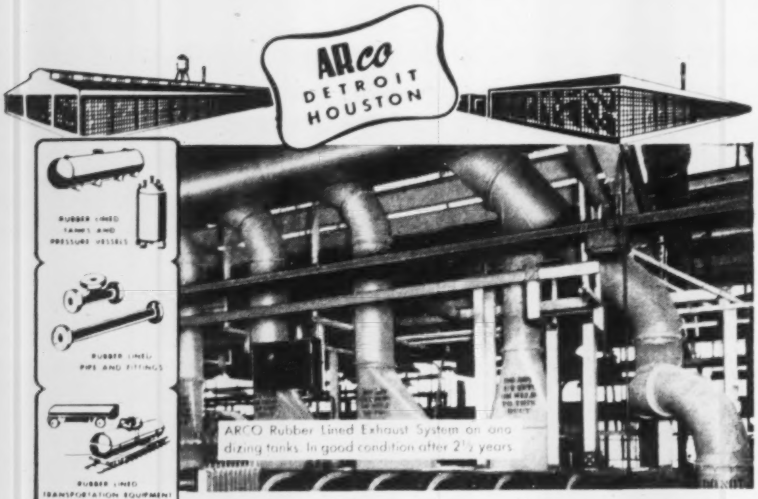
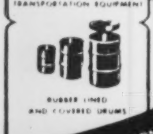


ARCO Rubber Lined Exhaust System on anodizing tanks. In good condition after 2½ years.


RUBBER LINED TANKS AND PRESSURE VESSELS
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Rubber Lined Equipment

Important to you is the *complete* control Arco exercises over every stage of production from compounding of the rubber specifically for your job to installation of the equipment.

This is assurance of quality and satisfaction. Write for our catalog.

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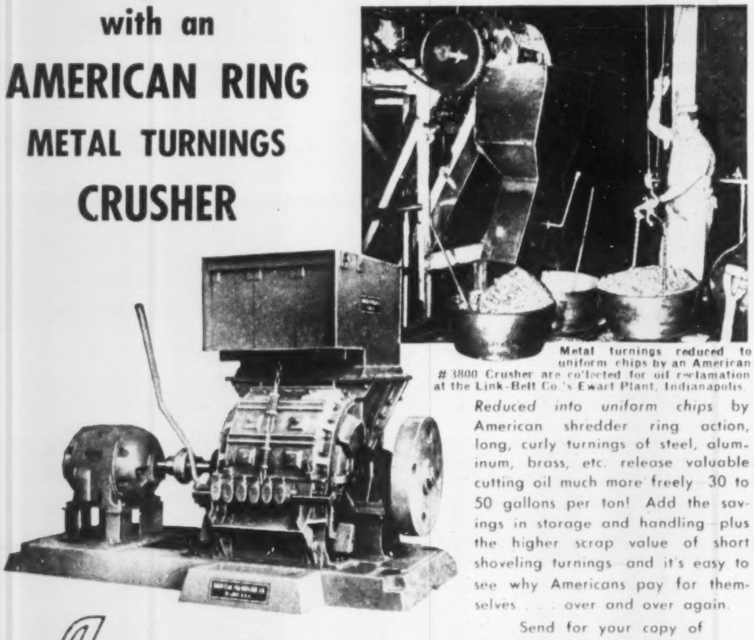
SOLVE SCRAP PROBLEMS PROFITABLY
with an
AMERICAN RING
METAL TURNINGS
CRUSHER



Metal turnings reduced to uniform chips by an American #3800 Crusher are collected for oil reclamation at the Link-Belt Co.'s Ewart Plant, Indianapolis.

Reduced into uniform chips by American shredder ring action, long, curly turnings of steel, aluminum, brass, etc. release valuable cutting oil much more freely 30 to 50 gallons per ton! Add the savings in storage and handling plus the higher scrap value of short shoveling turnings and it's easy to see why Americans pay for themselves . . . over and over again.

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"Metal Turnings Crushers" Bulletin

American PULVERIZER COMPANY
Originators and Manufacturers of Ring Crushers and Pulverizers

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and other ferroalloy metals continue to be in critical supply, as prospects for decontrol improve.

Wheeling Steel Corp., Wheeling, W. Va., says a sharp drop in first quarter sales is due to the imposition of government allocations and restrictions which affect adversely the corporation's normal business practices.

May 2—Ford Motor Co. receives an additional Army order for medium tanks, bringing their present orders for this weapon to above $300 million.

Metal Allotments Rise

NPA grants substantial boosts in third quarter allowances of steel, copper and aluminum.

May 5—Ohio River Steel Corp., Toronto, O., receives a grant for accelerated amortization of a $18.7 million expansion project.

DPA reports that industrial expansion covered by certificates of necessity was 52 per cent in place on Mar. 31.

Securities & Exchange Commission and Federal Trade Commission say profits of U.S. manufacturing corporations were 12 per cent lower in 1951 than in 1950, although sales mounted to a record $212.2 billion.

U. S. Steel Changes Officers

May 6—Benjamin F. Fairless becomes chairman and chief executive officer of U. S. Steel Corp., succeeding Irving S. Olds, who retires.

May 9—Crane Co., Chicago, producer of valves and fittings, sets up a new subsidiary, Toledo Desk & Fixture Corp., to operate a 20,000-square foot factory in Maumee, O.

The AISI reports hourly earnings for iron and steel wage earners averaged $1.95 in March. Workers averaged 39.8 hours a week.

May 12—A survey shows that first quarter earnings of 687 American corporations showed an average drop of 8.2 per cent from the similar period in 1951.

May 13—Lead prices in New York drop 2c, to 15c a pound.

Kaiser Aluminum & Chemical Corp. plans to boost aluminum production by 4 million pounds a month at its Trentwood rolling mill near Seattle.

May 14—Rohr Aircraft Corp. purchases an 80-acre site at Riverside, Calif., where it will build a plant to make power-packages for the Boeing C-97 Stratotanker.

May 15—The Navy announces the keel of its first atomic-powered submarine will be laid in June at Groton, Conn.

NPA reports it will end the ban on construction of entertainment and recreational facilities on July 1.

May 16—The steel industry now has a month's supply of scrap, NPA says. Scrap was scarce earlier this year.

May 17—A 15,000-ton forge press, made in Germany during World War II and leased from the Air Force, is now in operation at the Cleveland works of Aluminum Co. of America.

May 18—The 1953 Material Handling Exposition begins in Philadelphia's Convention Hall.

May 21 — The Penn-Ohio Steel Corp., Birdsboro, Pa., announces it has acquired control of Buhl Mfg. Co., Detroit.

Jones & Laughlin Steel Corp. is cutting back its program of 106 new coke ovens at its Pittsburgh works to 79 ovens.

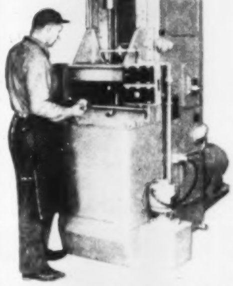
AISI Meets in New York

The American Iron & Steel Institute holds its 60th general meeting in New York. Walter S. Tower, retiring president, says surrender by the government to labor union pressure has brought a practical end to collective bargaining. Max D. Howell, vice president and treasurer of U.S. Steel Corp.,

three steps

to lower broaching costs

the American way



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American engineers design and build more than 50 models for surface and internal broaching. One of these standard models is probably the *right* model to speed your production, and lower your broaching costs. However, if yours is a special broaching problem, American can build you a special machine to beat that problem. Production bottlenecks are easily solved by American experience.

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American broaches are designed with the same skill used on American machines. We know the demands placed on broaching tools by machines and we build accuracy and durability into every American tool. They maintain closer tolerances, and last longer because they are built the American Way.

3

AN American FIXTURE

Excessive handling of the part being broached costs you money. To get the most from your machine and your broaching tools you need a fixture to properly hold and handle the part during the broaching operation.
Because American builds all three — machines, broaches, and fixtures — we have the know how to get the most from every fixture, every tool, every machine.

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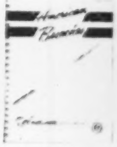
Send for American Broach Catalog #450, 32 pages of useful information on American products that solve broaching needs. Or if you have a special broaching problem in your plant, just send a part print or sample and hourly requirements for our engineers' specific answer. Address Dept. S. No obligation of course.



AMERICAN American BROACH & MACHINE CO.
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will become executive director of the AISI.

May 22—At the AISI meeting in New York, officials predict steel production will fall below capacity toward the end of the year.

Westinghouse Electric Corp. plans to build a "multi-million dollar" electric meter manufacturing plant at Raleigh, N. C.

May 23 — President Truman authorizes copper withdrawals of 22,000 tons from the nation's stockpiles. American firms may now raise prices of copper products in order to be able to pay more for imported copper. Prices can be raised in proportion to cost of foreign copper.

May 26—Jess Larson, DMPA head, announces that the government's metal and mineral expansion program has made substantial progress.

Three major aluminum producers say they can add 300,000 tons a year to their capacity if the government will underwrite their market. The companies are Kaiser Aluminum & Chemical Corp., Reynolds Metal Co., and Alcoa.

May 28—A new General Motors Corp. plant at Arlington, Tex., will produce $250 million worth of cars yearly, planners say.

May 30—Purchase of 30,000 tons of lead in 1952 is authorized by DPA, in building a civilian stockpile of metals which will operate in addition to the nation's military stockpile.

Whipple Jacobs, president of Phelps Dodge Copper Products Corp., says that government controls intensify the present shortage of copper. Consumers, worried about not getting copper when they want it, are taking the metal whether they need it or not.

JUNE

June 1—New metals, important in atomic work, will be produced by Carborundum Metals Co. Inc., a subsidiary of Carborundum Co., Niagara Falls, N. Y. Its new contract with the Atomic Energy Commission calls for production of zirconium and hafnium sponge metal.

Small firms are anxious to secure a larger slice of defense expansion work. SDPA has worked out a plan with DPA that should assure small companies of more certificates of necessity.

June 2—American Can Co. will produce 400 million food cans annually at a manufacturing plant to be built near Harrisburg, Pa., soon.

Nickel in Short Supply

June 4—NPA warns that demand for nickel is now double available supply and likely to get worse.

June 10—Eaton Mfg. Co., Cleveland, is building an $8 million plant at Marion, O., to produce automotive parts and forgings.

June 11 — Kaiser Steel Corp.'s Fontana, Calif., plant announces a new monthly production record with output of 122,036 tons of steel

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- Expertly trained men with more than 20 years blasting experience.
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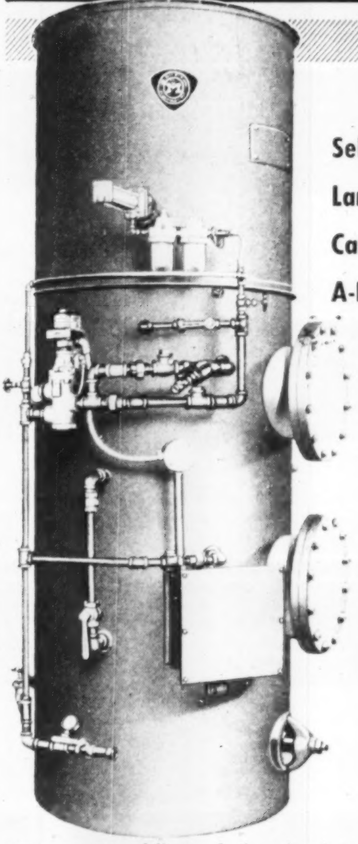
MACLEOD "AUTO-BLAST"

ABRASIVE BLAST CLEANING MACHINE



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The Macleod "Auto-Blast" machine can be used with rooms, tables, barrels, or special automatic devices.

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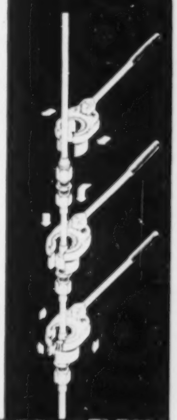

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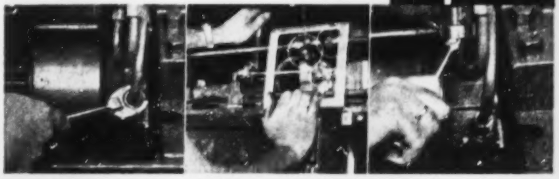

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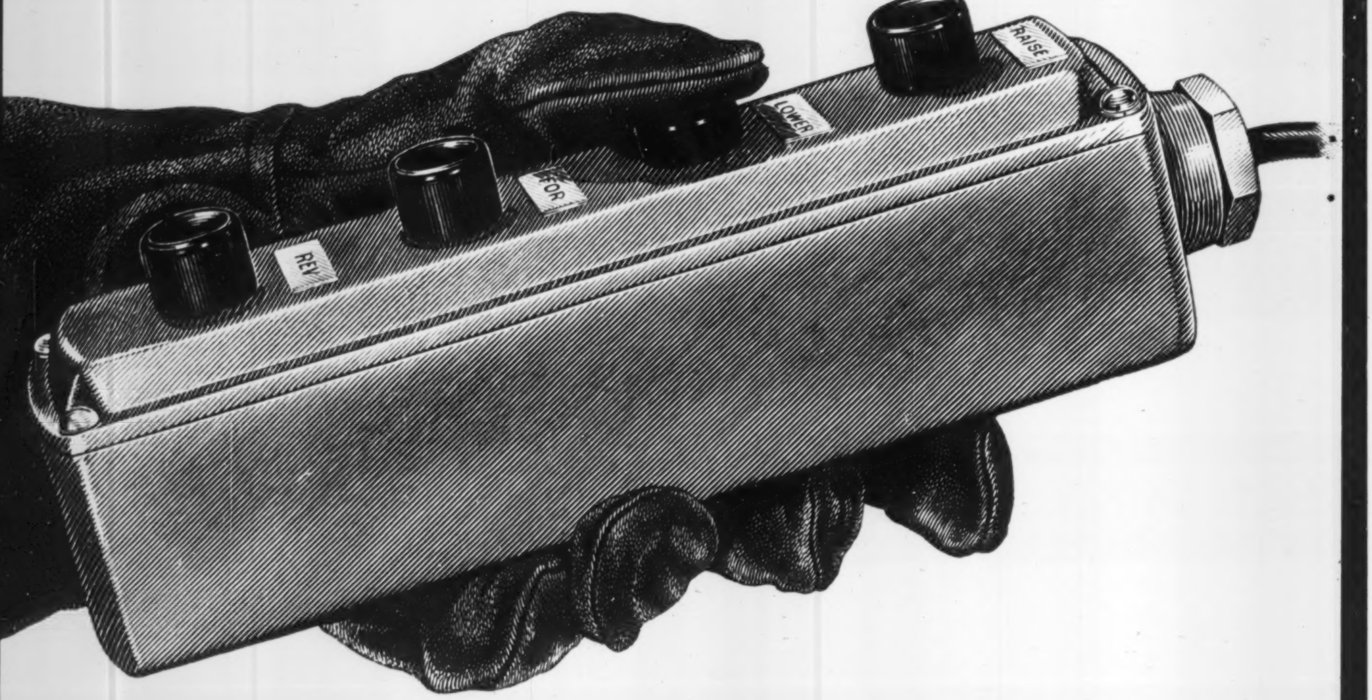

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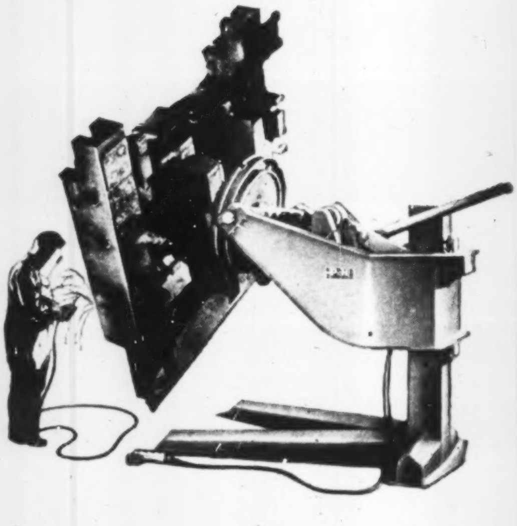

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ingots in May, as compared with its previous mark of 121,463 tons in Oct., 1951.

June 12—U.S. Steel Corp. will reduce its galvanized sheet prices by about $1.75 to $8.75 a ton depending on gage, because of a 1.5c a pound reduction in zinc prices. The zinc price reduction was partly due to deferment of zinc orders by strikebound steel mills.

June 13—Senate votes to kill wage and price controls Mar. 1, 1953.

June 16 — Vanadium Corp. of America will start production of an electric arc furnace at its unfinished $8 million plant near New Haven, W. Va., to produce ferrosilicon.

Ease Copper Shortage

Copper supplies are improving as NPA grants users more for consumer goods. A bonus allotment of 100 million pounds of copper and copper base alloys is announced for the third quarter. Increased imports help solve the shortage.

June 18—RFC grants a $31 million loan to Detroit Steel Corp. The loan, to be supplemented by funds from private sources, will finance a $45 million expansion designed to step up ingot production from 660,000 tons annually to 1,290,000 tons.

June 19—Ford Motor Co. says production is under way at its new Cleveland foundry, under construction for the past 26 months.

The National Safety Council reports the accident frequency rate for employees in all industries was 9.06 per 1 million man hours in 1951, a 3 per cent reduction from 1950. Steel's accident rate was 4.50 per 1 million man hours.

June 24—U.S. Steel Corp. receives a write-off certificate on 65 per cent of $99 million worth of iron ore transportation facilities at ore deposits in Venezuela.

June 26 — The Radio-Television Manufacturers Association says production dropped to 12.5 million units of radios and television sets combined in the year ending May 31, as compared with production of 23 million sets in the previous year.

ELECTRONICS TIDE RISES
. . . production, uses soar

Continue Steel Curbs

June 27—NPA says it must continue curbs on steel through July 1, as a result of the current steel strike.

NPA eliminates the last control on zinc and suspends limitations of inventories.

June 30—A midyear poll predicts great expansion in production of specially-designed machinery, electrical equipment and aircraft, and slight declines in standard machinery and machine tools this year. Production of about 4.8 million cars and 1.4 million trucks is anticipated this year in Canada and U. S.

JULY

July 1—Kaiser Aluminum & Chemical Corp. says its metallurgical research division in Spokane has developed a giant-size aluminum ingot for heavy press forgings.

Electronics production is at a rate eight times that of midyear 1950. This year's rate is $4 billion, $2.5 billion for military uses. Improved supplies of copper and aluminum help the industry, but cobalt and nickel scarcities hamper output.

July 2 — The National Industrial

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Conference Board reports less than 40 per cent of companies interviewed in a survey expect to surpass last year's sales figures.

July 3—A government program to build a civilian stockpile of lead got under way as DMPA announces it will buy 30,000 tons of the metal before yearend. The lead will be resold to industry if demand increases.

July 5—Shenango Agaloy Tube Co., Wheatland, Pa., is building a $3.5 million tube mill to produce carbon and stainless steel tubing.

July 7—Reo Motors Inc., Detroit, receives a defense order of $44,443,930 for trucks and spare parts.

July 8 — National Machine Tool Builders' Association says machine tool production is above the rate of $1 billion annually. Production in 1952 may double the 1951 output.

DPA says companies wanting fast tax writeoffs on new plants will have to locate them outside crowded industrial areas.

July 9—Jess Larson, General Services administrator, announces a nationwide government program for buying manganese ore from small domestic producers.

July 12—The Air Force will spend $4.5 million for a new rolling mill at Alcoa's Davenport, Iowa, works. The mill will produce tapered aluminum sheet and plate.

Metals Output Cheers DPA

Because free-world production of copper, molybdenum and tungsten is increasing, DPA officials say these metals will be in good supply in the U. S. during the third quarter of this year. DPA also believes supplies of aluminum will be ample for military and most civilian users by the second quarter, 1953.

July 15—The Aluminum Association reports a new monthly production record was set in May, when 161,607,096 pounds of primary aluminum were produced.

July 16—Kropp Forge Co., completes a $4.5 million expansion and improvement program at its Chicago works. New equipment includes a 40,000-pound drop forge hammer, one of the largest of its kind.

July 17—Air conditioning manufacturers report tremendous sales as a heat wave spreads through the nation.

July 18 — The Commerce Department reports that corporations paid $3.8 billion in cash dividends during the first six months of 1952, a 5 per cent increase over the amount a year earlier.

Bethlehem Steel Co. plans to spend $10 million to improve Lake Erie docks at its Lackawanna, N. Y., plant.

For Rent: Machine Tools

July 20—NPA announces that idle machine tools are available for rental through its newly-organized inventory of more than 30,000 surplus tools. They will be leased by NPA to manufacturers for as long as three years.

July 21—The Atomic Energy Commission lets two contracts totaling nearly $1 billion for expansion of atomic energy plants at Oak Ridge, Tenn., and Paducah, Ky.

Cold Metal Products Co., Youngstown, reveals plans to build a $3.5 cold-rolled strip steel mill in Indianapolis.

July 23—DPA calls for a $250 million capital investment in new facilities to produce machine tools. Meanwhile, tool makers received $104 million worth of new orders in June, the busiest month this year. A further boost is expected from anticipated revisions in NPA regulations permitting civilian industries to get additional machine tools.

Plan Metals Expansion

DPA sets seven new expansion goals. Iron ore production will be raised 57 million gross tons, to 147 million gross tons in 1955. Manganese will rise 630,000 gross tons

Meet the

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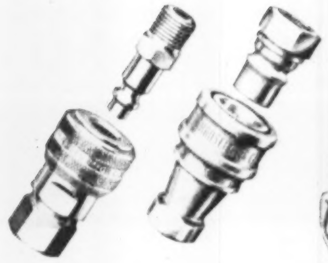
Representative



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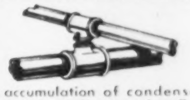

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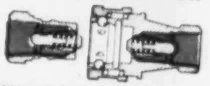

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to 2.5 million gross tons in 1954. Other programs call for an increase in electrolytic tin plate capacity from 2.8 million net tons in 1950 to 4.1 million net tons in 1955, and for doubling continuous galvanized sheet and strip capacity to 1.3 million short tons by 1954.

July 24—John L. Lewis serves notice that he will terminate his agreement with soft coal producers in 60 days.

July 28—An agreement between DMPA and E. I. du Pont de Nemours & Co., Wilmington, Del., calls for production of an additional 13,500 short tons of titanium sponge within five years. This is three times the company's present capacity.

July 29—Severe losses threatened in perishable foods may be averted by a government order reserving delivery of tin plate from steel mills for manufacturers of cans.

July 31—NPA lifts its 16-month ban on private imports of tin.

Bethlehem Steel Co. reports net profits of $2.19 a share during the first six months of this year, as compared with $4.74 a share for same period in 1951.

AUGUST

Aug. 1—Steel producers fear that weeks may pass before OPS will amend ceiling price regulations so that the steel price hike of $5.20 a ton, granted after the steel strike ended on July 24, can be reflected in increased prices for metal products.

Aug. 2—NPA, in a move to speed steel to defense-supporting producers, directs steel mills to reserve 20 per cent of their output to fill top-priority orders.

Aug. 3—OPS hints the aluminum industry will be allowed a price increase of one cent a pound for its products.

Aug. 4—Two new companies will join the iron and steel industry. Michigan Iron & Coke Co., Detroit, will establish a merchant iron and coke plant on the St. Clair river, at a cost of $25 million. Delaware River Steel Corp. schedules a $41.5 million blast furnace with coke ovens in New Castle county, Del.

Strike Effects Still Felt

Distribution of scarce steel creates headaches. NPA says CMP tickets for steel will all be honored eventually, although many will have to be cashed months later.

Business is making a steady recovery from the recent steel strike. Although major defense programs are behind schedule, production is picking up more rapidly than had been expected.

Aug. 5—First shipments from the new tin plate mill of Kaiser Steel Corp., Fontana, Calif., have been made two months ahead of schedule.

The Ruhr industrial section in Germany is now producing steel at 16 million tons a year, only about two million tons below top wartime production.

Aug. 6—DPA calls for a $396 million expansion of plant and equipment facilities to produce electronic items. The work will be finished by Jan. 1, 1954.

Aug. 7—U. S. Steel Corp.'s Columbia-Geneva Steel Division will operate a large tank castings plant at Pittsburg, Calif. The Army estimates it will spend $9.5 million to rebuild the plant.

Aug. 11—Decontrol sentiment continues strong despite effects of the steel strike. Copper supply and demand are virtually in balance, aluminum shortages aren't serious and optimism mounts regarding steel.

Republic Steel Corp. taps a new 275-ton open hearth furnace in Cleveland for its first batch of steel.

NPA will set up a new automatic allotment program which will cut in half the number of manufacturing firms which must apply each quarter for steel, copper and aluminum rations.

Pass-Through Battle Begins

Aug. 12—In the wake of the steel strike a battle is beginning over pass-through of increased costs of labor, freight and steel. OPS first suggested allowing a rise in selling prices of manufactured goods to reflect about 60 per cent of extra costs. Some believe a full 100 per cent pass-through may be necessary.

The Atomic Energy Committee picks a site in southern Ohio, 20 miles north of Portsmouth, O., for its planned $1.2 billion atomic plant.

Aug. 13—NPA believes the auto industry will begin 1953 at a production rate of 5 million cars annually.

Aug. 14—Auto manufacturers say the U. S. will lose production of 700,000 passenger cars in the last half of 1953 unless more steel is made available.

NPA Chief Henry Fowler sends telegrams to 100 steel companies, urging them to prevent steel users from accumulating excessive steel inventories.

Canadian Dollar Outranks Ours

The Canadian dollar rises to $1.0434 in New York, the highest point in 18 years.

Aug. 18—American Iron & Steel Institute says production of alloy steels topped 10 million tons of ingots and castings in 1951, the highest tonnage of alloy steel manufactured since 1944.

Aug. 19—Expected price increases for steel are made official, retroactive to July 26.

Aug. 20—For the week ending Aug. 16, iron ore shipments from the upper lakes region reached the highest weekly record in history, with 3,280,094 gross tons, compared with 3,186,811 for the preceding week.

Aug. 20—Republic Steel Corp. is now producing titanium at its Canton and Massillon, O., plants.

Please turn to page 502

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Calendar of Meetings

1953

January 11-13, Institute of Scrap Iron & Steel Inc.: Annual meeting, Hotel Commodore, New York. Institute address: 1729 H St. NW, Washington 6. Executive vice president: Edwin C. Barringer.

January 12-13, Industrial Furnace Manufacturers Association: Winter meeting, Hotel Cleveland, Cleveland. Association address: 420 Lexington Ave., New York.

January 12-15, American Management Association: Midwinter general management conference, Hotel Statler, Los Angeles. Association address: 330 W. 42nd St., New York 36. Information: Donald G. Keen.

January 12-16, Society of Automotive Engineers: Annual meeting & engineering display, Sheraton-Cadillac hotel, Detroit. Society address: 29 W. 39th St., New York 18.

January 13, Mining & Metallurgical Society of America: Annual meeting, Mining Club, New York. Society address: 11 Broadway, New York. Secretary: Lt. Col. Donald M. Liddell.

January 15-17, National Tool & Die Manufacturers Association: Winter quarterly meeting, Sorrento hotel, Miami Beach, Fla. Association address: 907 Public Square Bldg., Cleveland. Executive secretary: George S. Eaton.

January 19-23, American Institute of Electrical Engineers: Winter general meeting, Hotel Statler, New York. Institute address: 33 W. 39th St., New York 18. Secretary: H. H. Henline.

January 20, Cutting Tool Manufacturers Association: Annual meeting, Hotel Statler, Detroit. Association address: 416 Penobscot Bldg., Detroit. Secretary: Emil Gairing.

January 20-22, American Medical Association: Congress on Industrial Health, Drake hotel, Chicago. Association address: 535 N. Dearborn, Chicago 10. Secretary: Dr. C. M. Peterson.

January 20-22, Caster & Floor Truck Manufacturers Association: Winter meeting, Hotel Roosevelt, New York. Association address: 27 E. Monroe, Chicago. Secretary: H. P. Dolan.

January 21-22, Steel Shipping Container Institute: Winter meeting, Pierre & Hampshire House, New York. Institute address: 600 Fifth Ave., New York 20. Secretary: L. B. Miller.

January 22, American Coke & Coal Chemicals Institute: Regional meeting, Edgewater Beach hotel, Chicago. Institute address: 711 14th St. NW, Washington 5. Executive secretary: Samuel Weiss.

January 22-23, Steel Plate Fabricators Association: Annual meeting, Palmer House, Chicago. Association address: 37 W. Van Buren St., Chicago. Secretary: Dwight Evans.

January 23, Malleable Founders' Society: General meeting, Hotel Cleveland. Society address: Union Commerce Bldg., Cleveland 14. Managing director: Lowell D. Ryan. Secretary: John A. C. Warner.

January 26-28, Truck-Trailer Manufacturers Association Inc.: Annual winter meeting, Edgewater Gulf hotel, Edgewater Park, Miss. Association address: 1024 National Press Bldg., Washington. Managing director: John B. Hulse.

January 26-30, American Society of Heating & Ventilating Engineers: International heating & ventilating exposition, Grand Central Palace, New York. Society address: 51 Madison Ave., New York 10. Secretary: A. V. Hutchinson.

February 1-5, Associated Equipment Distributors: Annual meeting, Hotel Conrad Hilton, Chicago. Association address: 30 E. Cedar St., Chicago. Secretary: P. D. Hermann.

February 2, Cleveland Engineering Society: Annual machine design conference, society offices, 2136 E. 19th St., Cleveland 15. Information: Don Cornish.

February 4-6, Computor Conference Committee, Institute of Radio Engineers and American Institute of Electrical Engineers: Western computor conference, Hotel Statler, Los Angeles. Information: G. H. West, Public Relations Dept., Consolidated Engineering Corp., Pasadena 8, Calif.

February 9-11, American Road Builders' Association: Annual meeting, Hotel Statler, Boston. Association address: 1319 F St., NW, Washington 4. Secretary: Gen. Eugene Reybold.

February 15-19, Automotive Electric Association: Annual meeting, Edgewater Beach hotel, Chicago. Association address: 802 Michigan Bldg., Detroit 26. Secretary: S. W. Potter.

February 16-19, American Institute of Mining & Metallurgical Engineers: Annual meeting, Hotel Statler, Los Angeles. Institute address: 29 W. 39th St., New York 18. Secretary: E. H. Robie.

February 16-19, Industrial Ventilation Conference: Michigan State College, E. Lansing, Mich. Co-sponsor: Division of Industrial Health, Michigan Dept. of Health. Information: K. E. Robinson, Division of Industrial Health, Lansing 4.

February 18-20, Society of the Plastics Industry Inc.: Annual reinforced plastics conference, Shoreham hotel, Washington. Society address: 67 W. 44th St., New York 36. Executive vice president: William T. Cruse.

March 2-6, American Society for Testing Materials: Spring meeting, Hotel Statler, Detroit. Society address: 1916 Race St., Philadelphia. Secretary: Robert J. Painter.

March 2-6, Pittsburgh Section, American Chemical Society and Spectroscopy Society of Pittsburgh: Pittsburgh conference on analytical chemistry and applied spectroscopy, Hotel William Penn, Pittsburgh. Information: L. E. Pitzer, U. S. Steel Co., 525 Wm. Penn Place, Pittsburgh 30.

March 3-5, Society of Automotive Engineers: National passenger car, body and materials meeting, Hotel Sheraton-Cadillac, Detroit. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

March 6, Bituminous Coal Research Inc.: Annual meeting, Netherland Plaza hotel, Cincinnati. Institute address: 2609 First National Bank Bldg., Pittsburgh 22. Secretary: C. A. Reed.

March 8-11, American Institute of Chemical Engineers: Annual spring meeting, Hotel Buena Vista, Biloxi, Miss. Institute address: 120 E. 41st St., New York 17. Secretary: Stephen L. Tyler.

March 11, Foundry Education Foundation: Annual meeting and technical university & industry advisory committee conference, Hotel Cleveland, Cleveland. Foundation address: Terminal Tower, Cleveland 13. Executive director: George K. Dreher.

March 11-12, Society of the Plastics Industry Inc.: Annual Canadian conference, General Brock hotel, Niagara Falls, Canada. Society address: 67 W. 44th St., New York 36. Executive vice president: William T. Cruse.

March 15-19, American Chemical Society: Spring meeting, Hotels Statler and Biltmore, Los Angeles. Society address: 1155 16th St. N.W., Washington 6. Assistant secretary: R. M. Warren.

March 16-18, National Association of Waste Material Dealers: Annual meeting, Hotel Conrad Hilton, Chicago. Association address: 271 Madison Ave., New York 16. Secretary: Clinton M. White.

March 16-20, National Association of Corrosion Engineers: Annual conference, Hotel Sherman, Chicago. Association address: 919 Milam Bldg., Houston 2. Secretary: A. B. Campbell.

March 17-18, Steel Founders' Society of America: Annual meeting, Edgewater Beach hotel, Chicago. Society address: 920 Midland Bldg., Cleveland. Secretary: F. Kermit Donaldson.

March 18-20, American Society of Tool Engineers: Annual meeting, Hotel Statler, Detroit. Society address: 10700 Puritan Ave., Detroit 21. Executive secretary: Harry E. Conrad.

March 19, National Industrial Conference Board: General session, Netherland-Plaza hotel, Cincinnati. Board address: 247 Park Ave., New York. Secretary: Clyde L. Rogers.

March 19-20, American Hot Dip Galvanizers Association Inc.: Annual meeting, Netherland Plaza hotel, Cincinnati. Association address: 1506 First National Bank Bldg., Pittsburgh 22. Secretary: Stuart J. Swenson.

March 23-27, American Society for Metals: Western metals congress & exposition, Pan-Pacific Auditorium, Los Angeles. Information: 7619 Beverly Blvd., Los Angeles. Society address: 7301 Euclid Ave., Cleveland 3. Secretary: W. H. Eisenman.

March 23-27, National Association of Power Engineers Inc.: Annual spring meeting and exhibit, Hotel Sherman, Chicago. Association address: 176 W. Adams St., Chicago 3. Secretary: A. F. Thompson.

March 25-27, Pressed Metal Institute: Annual meeting, Hotel Carter, Cleveland. Institute address: 2860 E. 130th St., Cleveland 20. Managing director: Orrin B. Werntz.

March 25-27, Society of Automotive Engineers: National production meeting, Hotel Statler, Cleveland. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

March 31-April 2, The Magnesium Association: International magnesium exposition, National Guard Armory, Washington. Association address: 122 E. 42nd St., New York 17. Secretary: Martha I. Hanson.

April 7-9, Steel Shipping Container Institute: Annual meeting, Biltmore hotel, Palm Beach, Fla. Institute address: 600 Fifth Ave., New York 20. Secretary: L. B. Miller.

April 8-10, Society of the Plastics Industry Inc.: Pacific Coast conference, Last Frontier hotel, Las Vegas, Nevada. Society address: 67 W. 44th St., New York 36. Executive vice president: William T. Cruse.

April 9-10, Malleable Founders' Society: Market development conference, Cornell University, Ithaca, N. Y. Society address: Union Commerce Bldg., Cleveland 14. Managing director: Lowell D. Ryan.

April 9-11, Lead Industries Association: Annual meeting for members, The Greenbrier, White Sulphur Springs, W. Va. Association address: 420 Lexington Ave., New York 17. Secretary: Robert L. Ziegfeld.

April 12-15, American Supply & Machinery Manufacturers Association: Annual meeting and conference booth program, Hotel Columbus, Miami, Fla. Association address: 814 Clark Bldg., Pittsburgh 22. Secretary: R. Kennedy Hanson.

April 12-16, Electrochemical Society Inc.: Annual spring meeting, Hotel Statler, New York. Society address: 235 W. 102nd St., New York 25. Secretary: Dr. Henry B. Linford.

April 13-15, International Acetylene Association: Annual spring meeting, Hotel Biltmore, Atlanta. Association address: 30 E. 42nd St., New York 17. Secretary: H. F. Reinhard.

April 13-15, American Society of Lubrication Engineers: Annual meeting and exhibit, Hotel Statler, Boston. Society address: 343 S. Dearborn St., Chicago 4. Secretary: William P. Youngclaus Jr.

April 13-16, National Industrial Conference Board: Annual meeting for members, Miami, Fla. Board address: 1900 Arch St., Philadelphia 3. Secretary: H. R. Rinehart.

April 16-17, American Machine Tool Distributors Association: Spring meeting, Netherland Plaza hotel, Cincinnati. Association address: 1900 Arch St., Philadelphia 3. Secretary: Thomas A. Fernely Jr.

April 16-19, Grinding Wheel Institute: Spring meeting, The Homestead, Hot Springs, Va. Institute address: 2130 Keith Bldg., Cleveland 15. Manager: Hunter-Thomas Associates, re F. A. Peterson.

April 18-19, Packaging Machinery Manufacturers Institute: Spring meeting, Hotel Sheraton, Chicago. Institute address: 342 Madison Ave., New York 17. Secretary: Helen L. Stratton.

April 19-23, American Hardware Manufacturers Association: Spring meeting, Hotel Adolphus, Dallas. Association address: 342 Madison Ave., New York 17. Secretary: Arthur L. Faubel.

April 20-22, Metal Powder Association: Annual meeting and exhibit, Hotel Cleveland, Cleveland. Association address: 420 Lexington Ave., New York 17. Secretary: Robert L. Ziegfeld.

April 20-23, Society of Automotive Engineers: Aeronautic production forum; national aeronautic meeting, and aircraft engineering display, Hotels Governor Clinton & Statler, New York. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

April 20-23, National Screw Machine Products Association: Spring meeting, Hotel St. Moritz, New York. Association address: 2860 E. 130th St., Cleveland 20. Secretary: Orrin B. Werntz.

April 21-23, Caster & Floor Truck Manufacturers Association: Spring meeting, Edgewater Beach hotel, Chicago. Association address: 27 E. Monroe, Chicago. Secretary: H. P. Dolan.

April 22-23, American Institute of Steel Construction Inc.: Spring engineering conference, Detroit Engineering Society Bldg., Detroit. Institute address: 101 Park Ave., New York 17. Executive vice president: L. Abbett Post.

April 26-30, American Ceramic Society: Annual meeting, Hotel Statler, New York. Society address: 2525 N. High St., Columbus 2, O. Secretary: Charles S. Pearce.

April 27-28, American Zinc Institute Inc.: Annual meeting, Hotel Statler, St. Louis. Institute address: 60 E. 42nd St., New York 17. Secretary: E. V. Gent.

April 27-May 2, Concrete Reinforcing Steel Institute: Annual spring meeting, The Carolina, Pinehurst, N. Carolina. Institute address: 38 S. Dearborn St., Chicago 3. Managing director: H. C. Delzell.

April 28-30, American Society of Mechanical Engineers: Spring meeting, Deshler-Wallick hotel, Columbus, O. Society address: 29 W. 39th St., New York 18. Secretary: C. E. Davies.

May 3-7, Liquefied Petroleum Gas Association: Annual meeting and exhibit, Hotel Conrad Hilton, Chicago. Association address: 11 S. LaSalle St., Chicago 3. Secretary: Arthur C. Kreutzer.

May 4-6, Automotive Engine Rebuilders Association: Annual spring meeting, Netherland Plaza hotel, Cincinnati. Association address: 419 N. Capitol Ave., Indianapolis. Executive vice president: R. G. Patterson.

May 4-8, American Foundrymen's Society: Annual meeting, Chicago. Society address: 616 S. Michigan Ave., Chicago 5. Secretary: W. W. Maloney.

May 6-8, American Society of Training Directors: Annual meeting, Sheraton Plaza hotel, Boston. Society address: 2020 University Ave., Madison 5, Wis. Secretary: Russell L. Moberly.

May 7-8, Industrial Fasteners Institute: Annual meeting, Westchester Country Club, Rye, N. Y. Institute address: 3648 Euclid Ave., Cleveland. Secretary: James D. Eggers.

May 11-13, Rail Steel Bar Association: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Association address: 38 S. Dearborn St., Chicago 3. Secretary: W. H. Jacobs.

May 11-14, American Mining Congress: Annual meeting and exposition, Public Auditorium, Cleveland. Congress address: 1102 Ring Bldg., Washington 6. Executive vice president: Julian D. Conover.

May 14-15, National Association of Sheet Metal Distributors: Spring meeting, Deshler-Wallick hotel, Columbus, O. Association address: 1900 Arch St., Philadelphia 3. Secretary: Thomas A. Fernley Jr.

May 14-16, American Coal Sales Association: Annual spring meeting, The Greenbrier, White Sulphur Springs, W. Va. Association address: 1625 Eye St. NW, Washington. Executive vice president: W. W. Bayfield.

May 18-19, Association of Iron & Steel Engineers: Spring meeting, Hotel Statler, Buffalo, N. Y. Association address: 1010 Empire Bldg., Pittsburgh. Secretary: T. J. Ess.

May 18-20, Industrial Furnace Manufacturers Association: Annual meeting, The Homestead, Hot Springs, Va. Association address: 420 Lexington Ave., New York.

May 18-22, Material Handling Institute: National Material Handling Exposition, Convention Hall, Philadelphia. Institute address: 811 Clark Bldg., Pittsburgh 22. Managing director: R. Kennedy Hanson.

May 20-22, Gas Appliance Manufacturers Association: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Association address: 60 E. 42nd St., New York 17. Secretary: H. Leigh Whitelaw.

May 20-22, Society for Experimental Stress Analysis: Spring meeting, Hotel Schroeder, Milwaukee. Society address: Box 168, Cambridge 39, Mass. Secretary-treasurer: W. M. Murray.

May 21-22, National Industrial Conference Board: General session and directors meeting, Waldorf-Astoria hotel, New York. Board address: 247 Park Ave., New York. Secretary: Clyde L. Rogers.

May 24-27, Copper & Brass Research Association: Annual meeting, The Homestead, Hot Springs, Va. Association address: 420 Lexington Ave., New York 17. Secretary: B. B. Caddle.

May 24-27, National Association of Purchasing Agents: Annual meeting, Hotel Statler, Los

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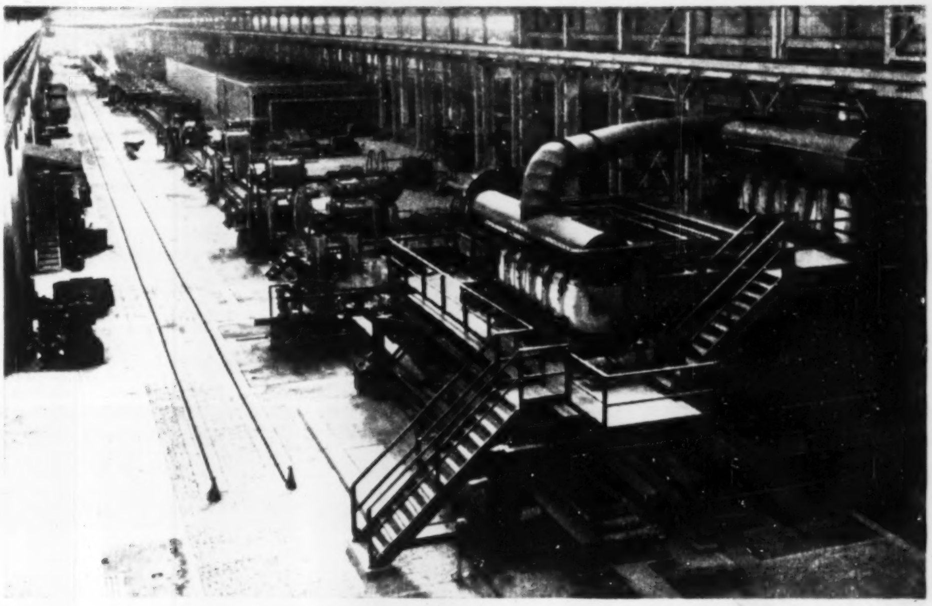

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MONTREAL AND TORONTO, CANADA: A. C. LESLIE & CO.

Angeles. Association address: 11 Park Place, New York 7. Secretary: George L. Renard.

May 24-28, Scientific Apparatus Makers Association: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Association address: 20 N. Wacker Drive, Chicago 6.

May 24-26, American Steel Warehouse Association: Annual meeting, Hotel Shoreham, Washington. Association address: 442 Terminal Tower, Cleveland. Secretary: Walter S. Doxsey.

May 25-27, Industrial Diamond Association of America Inc.: Annual meeting, Edgewater Beach hotel, Chicago. Association address: 124 E. 40th St., New York 16. Secretary: A. D. Leveridge.

May 26-29, American Leather Belting Association: Spring meeting, Skytop, Pa. Association address: 320 Broadway, New York 7. Secretary: E. R. Rath.

May 27-28, American Iron & Steel Institute: Annual meeting, Waldorf-Astoria hotel, New York. Institute address: 350 Fifth Ave., New York 1. Meeting director: Frank Ragland.

May 27-29, American Society for Quality Control: Annual meeting and exhibit, Convention Hall, Philadelphia. Society address: 70 E. 45th St., New York 17. Secretary: Edward B. Haden.

June 1-3, American Gear Manufacturers Association: Annual meeting, The Homestead, Hot Springs, Va. Association address: 302 Empire Bldg., Pittsburgh 22. Secretary: John C. Sears.

June 7-12, American Society of Automotive Engineers: Annual summer meeting, Hotels Ambassador and Ritz-Carlton, Atlantic City, N. J. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

June 8-9, Malleable Founders Society: Annual spring meeting, The Homestead, Hot Springs, Va. Society address: 1800 Union Commerce Bldg., Cleveland. Secretary: Lowell D. Ryan.

June 9-12, National District Heating Association: Annual meeting, Hotel Lookout Mountain, Chattanooga, Tenn. Association address: 827 N. Euclid Ave., Pittsburgh 6. Secretary-treasurer: John F. Collins Jr.

June 14-19, National Association of Cost Accountants: Annual meeting, Hotel Statler, Los Angeles. Association address: 505 Park Ave., New York 22. Secretary: Arthur B. Gunnarson.

June 15-18, Radio-Television Manufacturers Association: Annual meeting, Palmer House, Chicago. Association address: 777 14th St. NW, Washington 5. Secretary: James D. Secrest.

June 15-18, American Electroplaters' Society: Annual meeting, Benjamin Franklin hotel, Philadelphia. Society address: 445 Broad St., Newark, N. J. Secretary: D. Gordon Foulke.

June 15-19, American Institute of Electrical Engineers: Summer general meeting, Chalfonte-Haddon Hall, Atlantic City, N. J. Institute address: 33 W. 39th St., New York 18. Secretary: H. H. Henline.

June 16-19, American Welding Society: National spring technical meeting & welding and allied industry exposition, Shamrock Hotel and Hall of Exhibits, Houston. Society address: 33 W. 39th St., New York 18. Secretary: J. G. Magrath.

June 22-25, National Industrial Advertisers Association: Annual meeting, William Penn hotel, Pittsburgh. Association address: 1776 Broadway, New York. Executive secretary: Blaine G. Wiley.

June 28-30, Alloy Casting Institute: Annual meeting, The Homestead, Hot Springs, Va. Institute address: 32 Third Ave., Mineola, N. Y. Secretary: E. A. Schoefer.

June 29-July 3, American Society for Testing Materials: Annual meeting, Chalfonte-Haddon Hall, Atlantic City, N. J. Society address: 1916 Race St., Philadelphia. Secretary: Robert L. Painter.

July 23-24, Truck-Trailer Manufacturers Association Inc.: Annual summer meeting, Edgewater Beach hotel, Chicago. Association address: 1024 National Press Bldg., Washington. Managing director: John B. Hulse.

August 17-19, Society of Automotive Engineers: International West Coast meeting, Georgia hotel, Vancouver, B. C. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

August 30-September 2, National Automatic Merchandising Association: Annual convention and exhibit, Hotel Conrad Hilton, Chicago. Association address: 7 S. Dearborn, Chicago. Secretary: C. S. Darling.

September 1-4, American Institute of Electrical Engineers: Pacific general meeting, Hotel Vancouver, Vancouver, B. C. Institute address: 33 W. 39th St., New York 18. Secretary: H. H. Henline.

September 6-11, American Chemical Society: Fall meeting, Hotel Conrad Hilton, Chicago. Society address: 1155 - 16th St. NW, Washington 6. Assistant secretary: R. M. Warren.

September 13-17, Electrochemical Society Inc.: Fall meeting, Ocean Terrace hotel, Wrightsville Beach, N. Carolina. Society address: 235 W. 102nd St., New York 25. Secretary: Dr. Henry B. Linford.

September 14-16, Allied Railway Supply Association: Annual meeting, Hotel Sherman, Chicago. Association address: 1200 W. Chase Ave., Chicago 26. Secretary: Charles F. Weil.

September 21-22, Steel Founders' Society of America: Fall meeting, The Homestead, Hot Springs, Va. Society address: 920 Midland Bldg., Cleveland. Secretary: F. Kermit Donaldson.

September 21-23, American Mining Congress: Annual metal and nonmetallic mineral mining congress, Olympic hotel, Seattle. Congress address: 1102 Ring Bldg., Washington 6. Executive vice president: Julian D. Conover.

September 21-23, Truck Body & Equipment Association Inc.: Annual meeting, Sheraton-Gibson hotel, Cincinnati. Association address: 1122 DuPont Circle Bldg., Washington 6. Executive manager: Arthur J. Nuesse.

September 21-25, Instrument Society of America: Annual meeting, Hotel Sherman, Chicago. Society address: 1319 Allegheny Ave., Pittsburgh. Manager: P. V. Jones Jr.

September 28-30, Association of Iron & Steel Engineers: Annual meeting, Hotel William Penn, Pittsburgh. Association address: 1010 Empire Bldg., Pittsburgh. Managing director: T. J. Ess.

(Continued on Page 500)

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15 MODELS
16 to 90 Ton
JOHNSON
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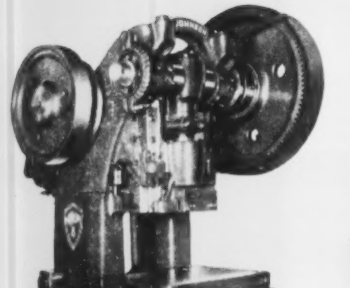
POWER PRESSES
Will give more service for your production dollar because you can handle larger jobs on smaller presses.



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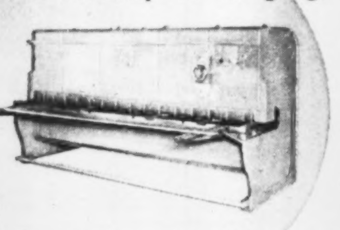

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CHIEF KEOKUK: . . . and ready with Electro-Silvery to help industry attack problems of iron and steel production . . .

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CHIEF KEOKUK JR: Hey, Pop, what *is* Electro-Silvery?

CHIEF KEOKUK: Electro-Silvery, Son, is a form of ferro-silicon that acts as a vital control element in the production of iron and steel . . .

PRINCESS WENATCHEE: . . . and the largest producer in the world of this vital ingredient is Keokuk Electro-Metals Company!

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The U.S. Steel Supply warehouseman has been trained to exercise the greatest care in selecting, shearing, sawing and burning steel to fit your needs. He handles all your materials with proper care and is quick to recognize the need for special packaging or other protection when necessary. He realizes that the steel you buy must be delivered to your satisfaction or the efforts of the entire U.S. Steel Supply team have been nullified.

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UNITED STATES STEEL

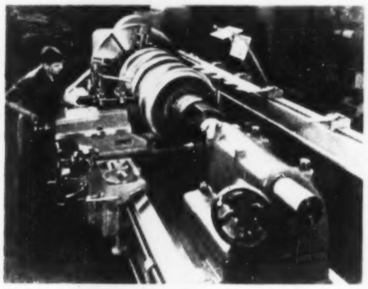
NEW PRODUCTS and equipment

Reply cards on page 512 will bring you more information on any new products and equipment in this issue

Roll Contouring Lathe

. . . two-directional tracing

Two-directional hydraulic tracing makes possible steep-angle contour turning on this 40-inch roll contouring lathe. Two hydraulic motors are controlled automatically through a single valve as the tracing stylus follows contours of a flat template mounted at the back of the lathe. One motor mounted at the carriage back drives the crossfeed screw; the other, in the conventional back box position, powers feed to the carriage.



Mechanical power rapid traverse to the carriage and cross slide in both directions is built into the apron. Hydraulic rapid traverse can be used to retract cross slide under tracer control. R. K. LeBlond Machine Tool Co., Dept. ST, Cincinnati 9, O.

USE REPLY CARD—CIRCLE No. 1

Electric Vapor Degreasers

. . . instant plug-in operation

This vapor degreaser is a production unit, portable, electrically-operated and thermostatically controlled. Provided with either 110 or 220 v heating element, it is ready for instant plug-in operation. Heat-up time is less than 20 minutes and requires only $2\frac{1}{2}$ gallons of solvent.

Caster-mounted base and plug-in features make portable operation possible. Thermostatic control maintains constant vapor level and prevents overheating. Accessories required on some degreasing operations, such as flusher pump, lip-vent and work-baskets, can be attached easily. J. D. Wallace & Co., Dept. ST, 134 S. California Ave., Chicago 12, Ill.

USE REPLY CARD—CIRCLE No. 2

Pressure-Measuring Instrument

. . . accuracy: one part in 5000

This pressure meter, called Press-I-Cell, can measure pressure with accuracy of one part in 5000. It has sensitivity of one part in 15,000. Meter is compact — 5-inches diameter, 14-inches long portable, temperature-stable and unaffected by vibration or mounting position. A 600-inch scale has easily-read interval of 1/16-inch representing 1/10,000th of full pressure range. Scale is printed on 35 mm film strip.

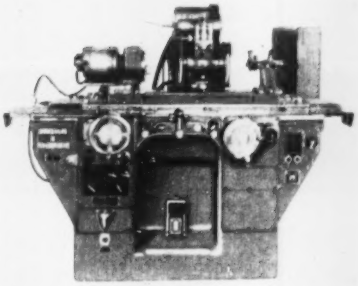
Two models are available: In the first, proper scale position is found by manual setting; scale is correctly positioned by a servo-motor in the second. Fischer & Porter Co., Dept. ST, Hatboro, Pa.

USE REPLY CARD—CIRCLE No. 3

Universal Grinding Machine

. . . redesigned for flexibility

This universal grinding machine has unit-type wheel spindle with antifriction bearings and sealed lubrication. Practical wheel speeds of 2500, 3000 and 3600 rpm provide wheel efficiency and economy. An independently driven, instantly available internal grinding spindle is furnished as standard equipment. Choice of spindle can be made for 16,500, 24,000 or 35,000 rpm.



Hydraulic table drive provides smooth movement with speeds infinitely variable from 3 to 150 inches per minute. Variable speed headstock drive reaches from 60 to 600 rpm. Universal turret provides

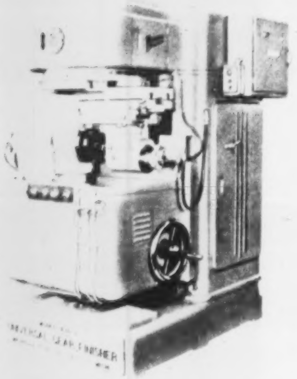
4 inches adjustment of wheel spindle head at right angles or parallel to wheel slide. Fine cross feed is adjustable to 0.001-inch on work diameter. Brown & Sharpe Mfg. Co., Dept. ST, Providence 1, R. I.

USE REPLY CARD—CIRCLE No. 4

Internal Gear Finisher

. . . takes 12-inch OD gears

This spur and helical internal gear finisher takes maximum 12-inch OD gears. Internal gears as small as 4-inch pitch diameter can be finished. It accommodates smaller sizes with a special cutter spindle. Machine employs transverse or reciprocating shaving method. Plunge shaving can also be performed on the model 870-C by adding an optional plunge-feed mechanism.



Adjustment flexibility is provided for spindle speed, reciprocating action, cycle time and loading and unloading. Work spindle and optional air-operated clamping adapter swivel out and away from the cutter to facilitate loading and promote safety. Michigan Tool Co., Dept. ST, 7171 E. McNichols Rd., Detroit 12, Mich.

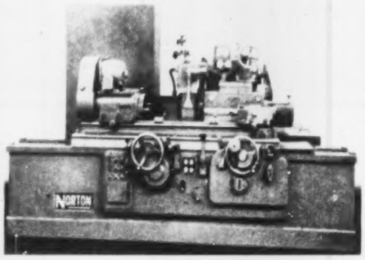
USE REPLY CARD—CIRCLE No. 5

Cylindrical Grinding Machines

. . . provide larger wheels

Plunge-cut and traverse grinding operations that require larger diameter or wider grinding wheels than the conventional can be accommodated on these plain or semiautomatic cylindrical grinding machines. An important feature of the 10-inch type CTU-HD and the 14-inch type LCTU-HD machines is the heavy wheel head with pressure-lubricated wheel spindle for wheels up to 10 inches wide.

Precise revolving feed screw mechanism controls wheel feed. Feed screw has a click-count index by which settings for 0.001-inch work diameter reduction are made instantly and without visual attention. Operation is simplified by automatic control of work rotation and coolant flow. Norton Co., Dept. ST, Worcester 6, Mass.



USE REPLY CARD—CIRCLE No. 6

Precision Tool Grinder

. . . sharpens all tool material

This precision tool grinder uses 6-inch cup-type wheels to sharpen any of the modern tool materials. Because of its smoothness and true-running characteristics, it is especially designed for grinding carbide with diamond wheels. Capacity includes work on all sizes of boring, turning and facing up to $\frac{5}{8}$-inch square or equal cross-sectional area.

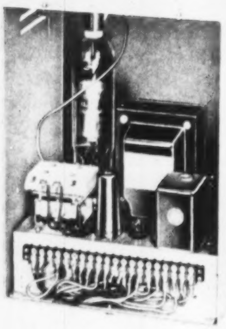
Heavy steel base has ample height for operator convenience. U-shaped tool rest tables are rigidly supported. Tables can be tilted easily to exact angle required; adjustment is shown in a scale that reads in degrees. Spindle shaft is carried in a combination radial and thrust bearings that permit a minimum radial and end play. Reversible motor permits left and right-hand tools on the same wheel. Ex-Cell-O Corp., Dept. ST, 1200 Oakman Blvd., Detroit 32, Mich.

USE REPLY CARD—CIRCLE No. 7

Electronic Drive Control

. . . in fractional horsepower

This packaged drive provides electronic variable speed control for fractional horsepower motors. Electronic adjustable speed control unit drives a series motor. It provides wide stepless range of control with good speed regulation under varying loads. Speeds from 100 to 3500 rpm are available. Motor can be started, stopped or dynamically braked, and can be accelerated rapidly to preset speeds.



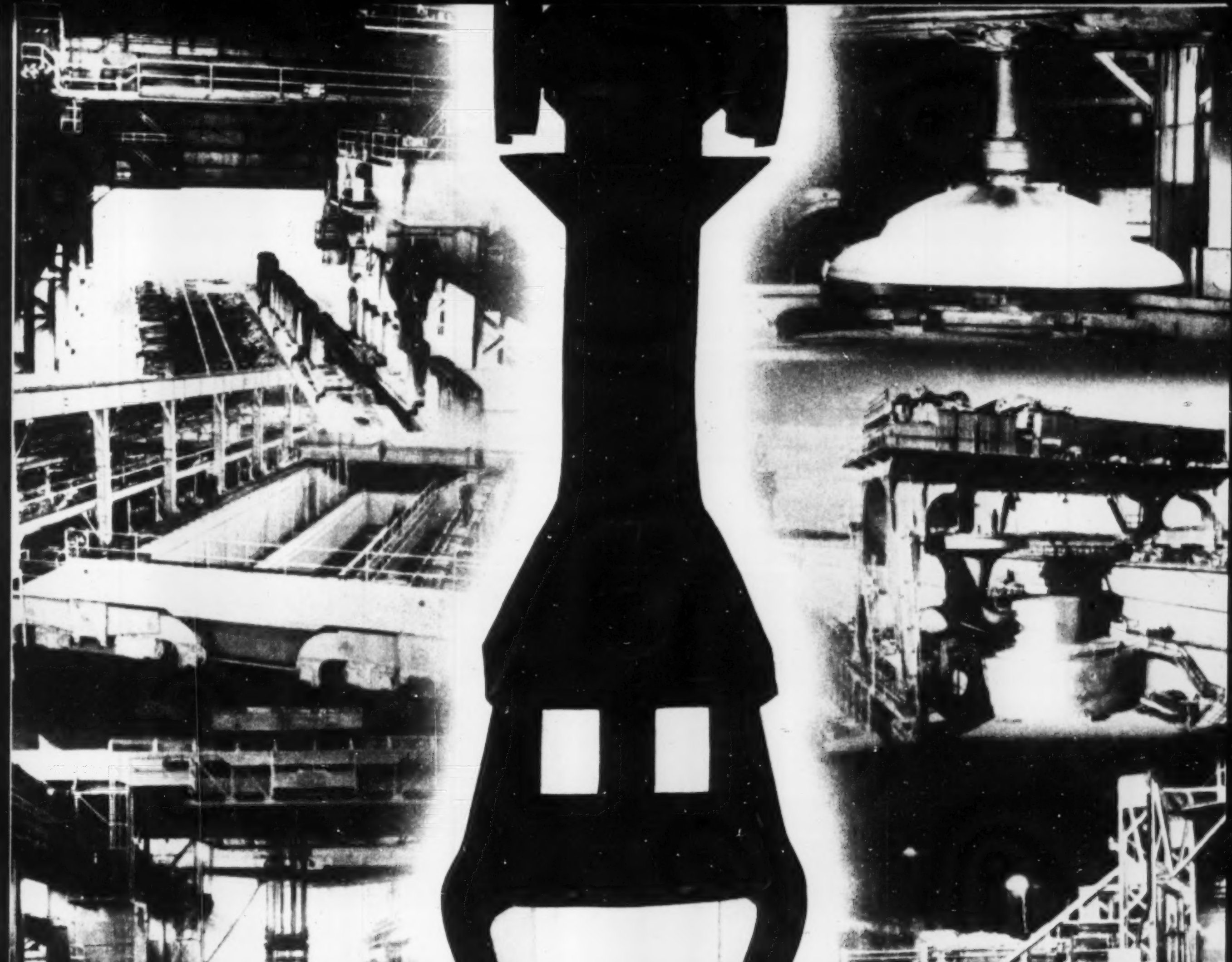
Series motor makes use of both alternating and direct current output from a single thyratron tube. As a pilot device, the push-pull selector switch can be used. Arrow-Hart & Hegeman Electric Co., Dept. ST, 103 Hawthorn St., Hartford 6, Conn.

USE REPLY CARD—CIRCLE No. 8

Snap Action Switches

. . . for low actuating forces

Snap action switches, designed for actuating forces as low as $\frac{1}{2}$-ounce, are provided with rigid lever integral actuators which adapt them to actuation by cams or by straight-line motion. This series



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is useful in low-force, cam-actuated applications on instruments and meters as well as rotary switch assemblies, sequence switching gangs, etc. Micro Switch, Dept. ST, Freeport, Ill.

USE REPLY CARD—CIRCLE No. 9

Electric Soldering Iron

. . . weighs 2 ounces

Pencil type electric soldering iron weighs 2 ounces and is available in two wattage ratings: 25 and 40 watts. The handle is made of plastic; the tip is ⅛-inch diameter. Lenk Mfg. Co., Dept. ST, 30-38 Cummington St., Boston 15, Mass.

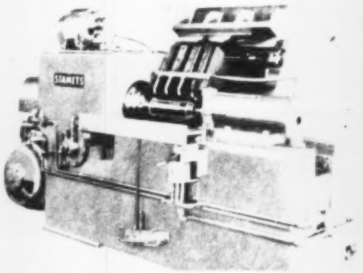
USE REPLY CARD—CIRCLE No. 10

Mass Production Shell Lathe

. . . shell range: 75 to 240mm

Single-purpose shell lathes are designed for mass producing high explosive shells from 75 to 240 mm. Three basic types are offered: Rough turning, finish turning and base-facing or cutoff.

Lathes are designed as single-purpose machines to simplify production tooling and minimize downtime. Master switch control permits one workman to operate two or more lathe units. Machining patterns are cam-controlled for accuracy and lathes are fitted with high speed carbide cutting tools. Wm. K. Stamets Co., Dept. ST, Jenkins Arcade Bldg., Pittsburgh 22, Pa.



USE REPLY CARD—CIRCLE No. 11

Resurfacing Compound

. . . ready for traffic in 60 sec

Cryptolite has been added to Swift-Floor plastic floor resurfacing compound to make a harder, more resilient floor surface. The compound can be applied over wood, concrete, brick or steel floors, indoors or out. It forms a nonskid surface that is ready for heavy traffic 60 seconds after application. Monroe Co. Inc., Dept. ST, 10703 Quebec Ave., Cleveland 3, O.

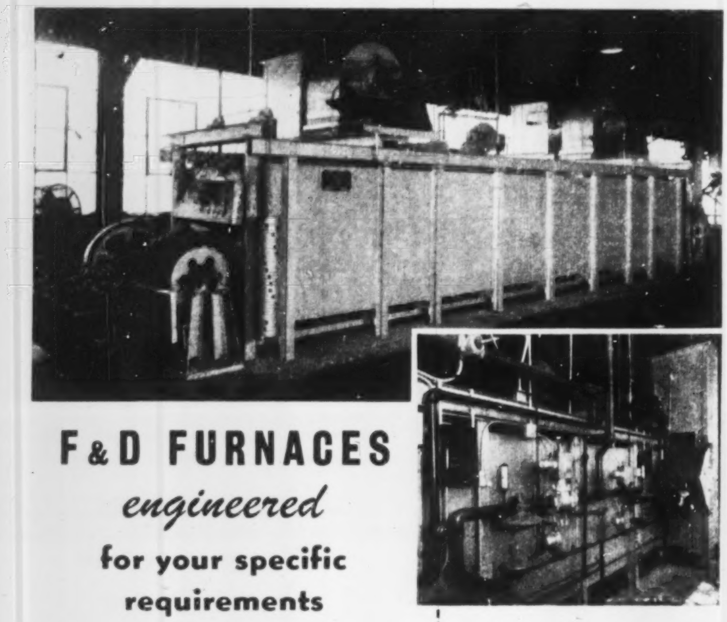
USE REPLY CARD—CIRCLE No. 12

Form Tooth Slotters

. . . carbide replaces steel

Contour tooth form enables users to employ carbide in cutting slots that require a form, replacing steel cutters necessary in the past. A wide variety of convex forms, including radius and radius with angles tangent and their variations, can be produced to customer specifications.

Carbide tips are brazed into a circular pocket. They are available



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engineered
for your specific requirements

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Over a period of many years F & D engineers have been supplying engineered furnaces for "high production at lowest cost" for use in steel plants, forge shops, foundries, fabricating plants, etc. The supplying of outstanding standard furnaces or special design furnaces for unusual demands—all backed by years of furnace engineering technique to provide the most economical operation for your production is our business.

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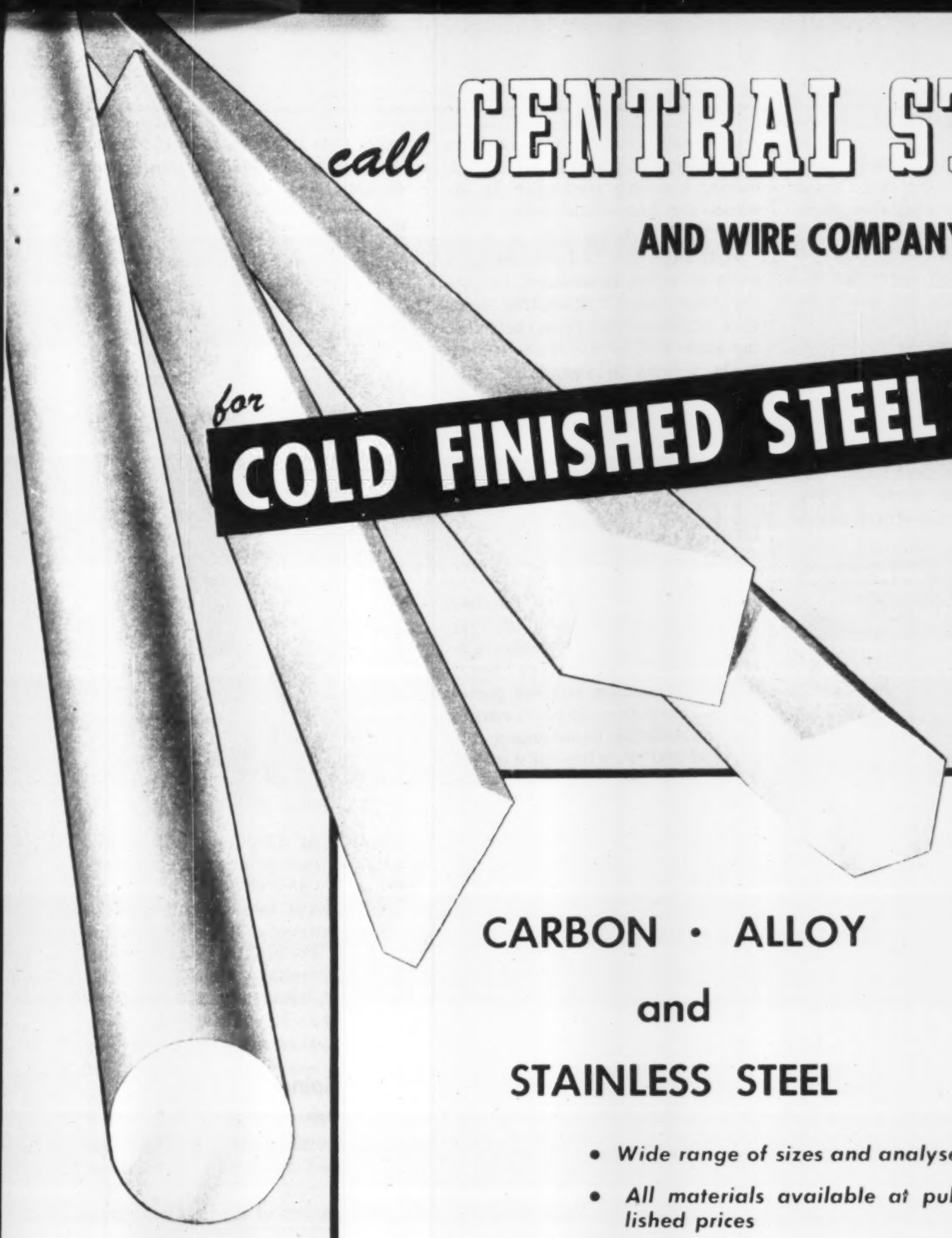

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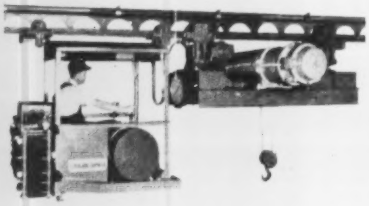
in diameters up to 8 inches, in thicknesses from 0.030-inch. Solid carbide saws are available from 0.020-inch. Either type can be produced with contour tooth forms so proper resharpening does not destroy the contour. Gay-Lee Co., Dept. ST, Clawson, Mich.

USE REPLY CARD—CIRCLE No. 13

Overhead Traveling Carrier

. . . has hydraulic cell scale

This overhead traveling carrier is equipped with hydraulic cell scale to weigh all loads quickly and easily. The motor-driven tramrail carrier has a travel speed of 300 fpm. Hoist speed hits 38 fpm and lift reaches 36 feet. Both travel and hoisting motors have variable-speed controllers. In addition, hoisting controller is designed for dynamic lowering. Load capacity is 3 tons.



Hydraulic cell is operated by a lever to which is fastened the upper hoist block. Resulting pressure is transmitted from the cell to the scale dial by hydraulic tubing. Scale weighs in pounds or kilograms, as desired. Cleveland Tramrail Division, Cleveland Crane & Engineering Co., Dept. ST, Wickliffe, O.

USE REPLY CARD—CIRCLE No. 14

Emulsion Cleaner

. . . has high flash point

Pennsalt EC-54 is an emulsion cleaner that will not boil off, evaporate or flash at use temperatures. It will clean nonferrous metals without tarnishing and will protect ferrous parts from in-plant rusting. The emulsifiable liquid has a flash point of 260° F, a fire point of 300° F and 95 per cent boils within a range of 500 to 600° F. Pennsylvania Salt Mfg. Co., Dept. ST, 1000 Widener Bldg., Philadelphia 7, Pa.

USE REPLY CARD—CIRCLE No. 15

Versatile Hauling Tractor

. . . combines walk, ride types

Tractor's design enables operator to walk tractor and load on short hauls, ride when the run is longer. Tractor is made with either 12 or 18-v battery. Overall dimension of 12-v unit: 27 inches wide, 48 inches long. Larger tractor is 31 x 48 inches.

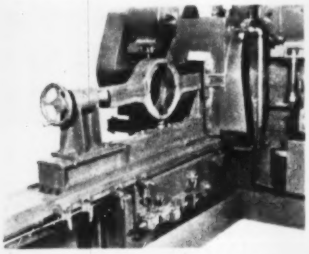
Both have two walking speeds, with maximum of 3½ mph. A third speed of 4½ mph is possible when operator rides. Moto-Truc Co., Dept. ST, 1959 E. 59th St., Cleveland 3, O.

USE REPLY CARD—CIRCLE No. 16

Double-Spindle Grinder

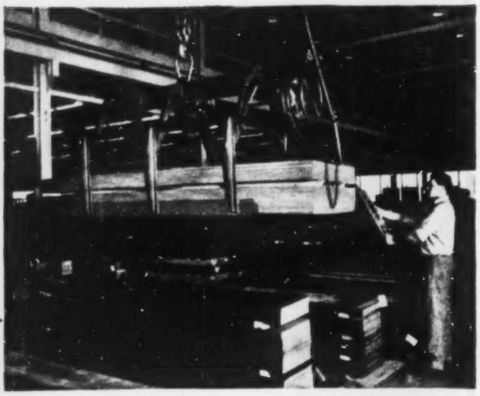
. . . grinds parallel axle faces

Model 125 double spindle grinder is designed to grind parallel faces of rear truck axle housings. Machine consists of a heavy cast iron base supporting two opposed grinding heads upon slides with ball bearing ways.



Production averages 30 parts per

(Please turn to Page 510)



One Sure Way to CUT COSTS!

use a C-F SHEET LIFTER

The A. B. Dick Company, Niles, Illinois, found that this C-F Lifter has substantially reduced man hours and crane time required to move stock in and out of storage.

Up to 10,000 lbs. of high grade sheets in varying widths may be picked up, carried and unloaded at shears or machines with speed and economy by the Lifter and its operator.

C-F Lifters are made in standard or semi-special models to handle from 2 to 60 tons. Bulletin SL describes the advantages you can obtain from C-F Lifters. Write for it today.

CULLEN-FRIESTEDT CO.
1308 South Kilbourn Avenue • Chicago 23, Illinois

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WHEN SO MUCH

DEPENDS ON A QUALITY SOLVENT

IT PAYS TO SPECIFY

SPEEDY, DEPENDABLE...

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METAL DEGREASING GRADE
TRICHLOROETHYLENE
E. I. DU PONT DE NEMOURS & CO. (INC.) WILMINGTON 98, DELAWARE

"TRICLENE" D Trichlorethylene is the result of over 20 years of research and practical experience in the degreasing field. Made under carefully controlled conditions by the pioneer manufacturer of degreasing solvents in the U. S., each shipment of "Triclene" D is carefully pretested for stability and purity . . . must meet test standards higher than those established by military and federal specifications (MIL-7003 and O-T-634). Yet "Triclene" D costs no more than other leading brands of degreasing solvents.

"Triclene" D is available nationally in 55 gallon drums and tank cars of various sizes. Distribution points in over 100 principal cities are ready to serve you with prompt deliveries. And trained Du Pont technical representatives with broad experience in the field will be happy to work closely with you in keeping your degreasing installations operating at peak efficiency.

E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Dept., Wilmington 98, Delaware.

Send for your copy of "Vapor Degreasing with Du Pont Non-Flammable Solvents." It shows you how and where "Triclene" D can be used to save time and cut costs in metal cleaning.

E. I. du Pont de Nemours & Co. (Inc.)
Electrochemicals Dept., Wilmington 98, Delaware

Please send me detailed information on Vapor Degreasing: applications, advantages, equipment used . . . and more facts on Du Pont "Triclene" D. We are interested in cleaning____products.

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150th Anniversary

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

(Continued from page 490)

October 5-7, American Society of Mechanical Engineers: Fall meeting, Hotel Sheraton, Rochester, N. Y. Society address: 29 W. 39th St., New York 18. Secretary: C. E. Davies.

October 7-9, National Association of Corrosion Engineers: South Central regional meeting, Mayo hotel, Tulsa, Okla. Association address: 1061 Milam Bldg., Houston 2. Executive secretary: A. B. Campbell.

October 7-9, Pressed Metal Institute: Fall meeting, Bellevue-Stratford hotel, Philadelphia. Institute address: 2860 E. 130th St., Cleveland 20. Managing director: Orrin B. Werntz.

October 8-9, Rail Steel Bar Association: Semiannual meeting, Hotel Sheraton, St. Louis. Association address: 38 S. Dearborn St., Chicago 3. Secretary: W. H. Jacobs.

October 8-9, Gray Iron Founders Society Inc.: Annual meeting, Hotel Jefferson, St. Louis. Society address: 210 National City-E. 6th St. Bldg., Cleveland. Executive vice president: Donald H. Workman.

October 12-14, Packaging Institute: Annual meeting, Hotel Statler, New York. Institute address: 342 Madison Ave., New York 17. Secretary: L. V. Burton.

October 12-16, National Association of Sheet Metal Distributors: Annual meeting, Marlborough-Blenheim hotel, Atlantic City. Association address: 1900 Arch St., Philadelphia 3. Secretary: Thomas A. Fernley Jr.

October 12-17, Concrete Reinforcing Steel Institute: Semiannual fall meeting, The Greenbrier, White Sulphur Springs, W. Va. Institute address: 38 S. Dearborn St., Chicago 3. Managing director: H. C. Delzell.

October 14-16, Scientific Apparatus Makers Association: Midyear meeting, recorder-control section, Seaview Country Club, Absecon, N. J. Association address: 20 N. Wacker Drive, Chicago 6.

October 15-17, Foundry Equipment Manufacturers Association: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Association address: Engineers Bldg., Cleveland 14. Secretary: Arthur J. Tuscany.

October 17-18, American Society for Metals: Annual Seminar, Hotel Statler, Cleveland. Society address: 7301 Euclid Ave., Cleveland 3. Secretary: W. H. Eisenman.

October 18-20, Conveyor Equipment Manufacturers Association: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Association address: 1 Thomas Circle, Washington 5. Executive vice president: R. C. Sollenberger.

October 18-23, National Screw Machine Products Association: Fall meeting, Edgewater Gulf hotel, Edgewater Park, Miss. Association address: 2860 E. 130th St., Cleveland 20. Secretary: Orrin B. Werntz.

October 19-21, American Standards Association: Annual meeting, Waldorf-Astoria hotel, New York. Association address: 70 E. 45th St., New York 17. Secretary: Vice Adm. G. F. Hussey Jr., USN (Ret.).

October 19-23, American Metal Congress & Exposition: Public Auditorium, Cleveland. Secretary: W. H. Eisenman, 7301 Euclid Ave., Cleveland 3.

October 22-25, National Tool & Die Manufacturers Association: Annual fall meeting, Berkeley-Carteret hotel, Asbury Park, N. J. Association address: 907 Public Square Bldg., Cleveland. Executive secretary: George S. Eaton.

October 26-28, National Lubricating Grease Institute: Annual meeting, Edgewater Beach hotel, Chicago. Institute address: 4638 J. C. Nichols Parkway, Kansas City, Mo. Secretary: Harry F. Bennetts.

October 26-28, American Gear Manufacturers Association: Fall meeting, Edgewater Beach hotel, Chicago. Association address: 302 Empire Bldg., Pittsburgh 22. Secretary: John C. Sears.

October 26-29, American Gas Association: Annual meeting, Kiel Auditorium, St. Louis. Association address: 420 Lexington Ave., New York 17. Secretary & convention manager: Kurwin R. Boyes.

October 29-30, Society of Automotive Engineers: International production meeting, Royal York hotel, Toronto, Ont. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

October 30-31, American Institute of Mining & Metallurgical Engineers, National Open Hearth Committee: Annual conference, Southern Ohio section, Deshler-Wallick hotel, Columbus, O. Institute address: 29 W. 39th St., New York 18. Secretary: Edward H. Robie.

November 2-6, American Institute of Electrical Engineers: Fall general meeting, Hotel Muehlebach, Kansas City, Mo. Institute address: 33 W. 39th St., New York 18. Secretary: H. H. Henline.

November 4-6, Steel Founders' Society of America: Annual T & O Conference, Hotel Carter, Cleveland. Society address: 920 Midland Bldg., Cleveland. Secretary: F. Kermit Donaldson.

November 9, The Wire Association: Annual meeting, La Salle hotel, Chicago. Association address: 453 Main St., Stamford, Conn. Executive secretary: Richard E. Brown.

November 9-12, National Electrical Manufacturers Association: Annual meeting, Haddon Hall, Atlantic City, N. J. Association address: 155 E. 44th St., New York 17. Managing director: W. J. Donald.

November 13-18, National Association of Waste Material Dealers: Fall meeting, Hollywood Beach hotel, Hollywood-by-the-Sea, Fla. Association address: 271 Madison Ave., New York 16.

November 30-December 3, American Institute of Steel Construction Inc.: Annual convention, Boca Raton Club, Boca Raton, Fla. Institute address: 101 Park Ave., New York.

December 7-10, Scientific Apparatus Makers Association: Midyear meeting, laboratory apparatus, equipment and optical sections, Boca Raton Club, Boca Raton, Fla. Association address: 20 N. Wacker Drive, Chicago 6.

December 3-5, American Institute of Mining & Metallurgical Engineers: Annual electric furnace steel conference, Netherland-Plaza hotel, Cincinnati. Institute address: 29 W. 39th St., New York 18. Secretary: Edward H. Robie.

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PUNCH TYPE CUT-OFFS

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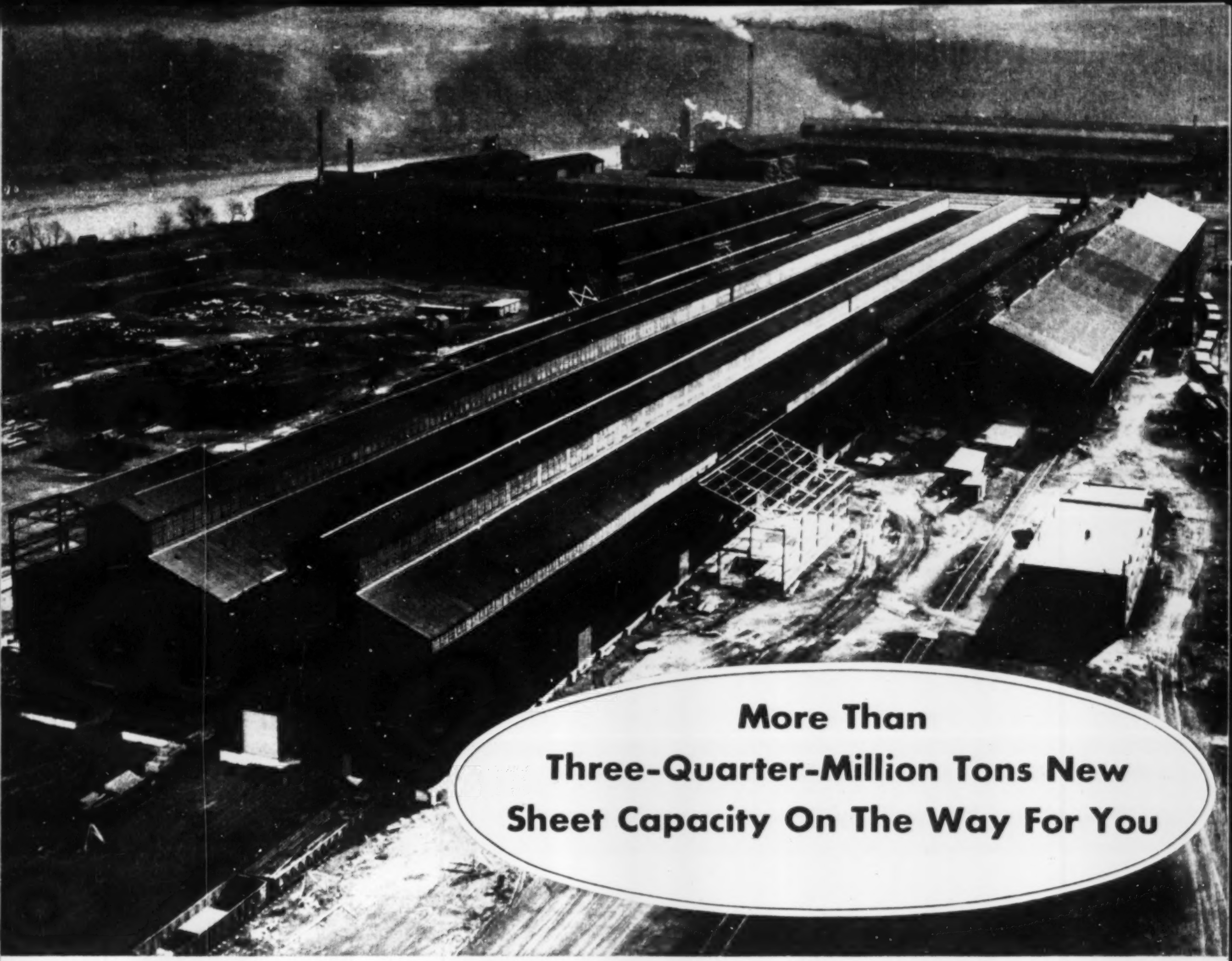

More Than
Three-Quarter-Million Tons New
Sheet Capacity On The Way For You

Progress in Steel . . . *A New Steel Company*

Pittsburgh Steel is rapidly becoming a new steel company through its Program of Progress which includes the vast construction project shown above. The modern continuous sheet and strip mills being installed in these new buildings will have a capacity of more than three-quarter-million tons of sheet and strip each year—products never before produced by the company.

When completed early in 1953, these mills will supply hot and cold-rolled sheets and strip to all industry. They will help alleviate the heavy demand for more munitions, vehicles and ships for our armed forces—at the same time supply steel for more automobiles, household appliances, furniture and countless other items of daily use.

The construction of these new mills is an important part of Pittsburgh Steel's Program of Progress which in three years has transformed the company by expanding and diversifying its line of products. In 1953 the broad objectives of increasing finished product capacity 82% and ingot capacity 48% will be reached. The main points in this $60-million program are outlined below.

Pittsburgh Steel's expansion program means more to you than increased steel tonnages and broader lines of wire, tubular and flat-rolled products. It is a substantial contribution to the well-being of the free world as ample supplies of steel are required to keep the defense program at its peak and at the same time maintain a high level of civilian economy.

Program of Progress

Acquisition of Thomas Steel Company	100% Complete
Increase of Blast Furnace Capacity by 12%	65% Complete
Increase of Open-Hearth Capacity by 48%	68% Complete
Installation of new 66-inch High Lift Blooming-Slabbing Mill	100% Complete
Installation of Continuous 66-inch Hot Rolled Sheet-Strip Mill	84% Complete
Installation of 66-inch Cold Rolled Sheet-Strip Mill	79% Complete

Pittsburgh Steel Company

Pittsburgh, Pennsylvania

Aug. 21—NPA reports inventories of steel scrap are at record heights. Some 4.7 million tons are on hand as compared with 2.6 million a year ago, in leading mills.

Aug. 25—U. S Steel Corp. reports its earnings for the first six months of this year were $65.7 million, compared with $106.7 million for the first six months of 1951.

Aug. 27—Henry Fowler of NPA believes manufacturers will be able to get all the copper they need by second quarter, 1953.

SEPTEMBER

Sept. 1 — Westinghouse Electric Corp., Pittsburgh, believes it is producing the world's most powerful qualified turbojet engine, with a thrust equal to 25,000 horsepower at present jet flight speeds.

Sept. 2—Production of aluminum in August totaled 85,175 tons, the highest amount in a single month since World War II.

The copper industry's fears of a major strike are lifted as workers agree to new wage pacts.

Boeing Airplane Co. has started construction of a prototype jet transport plane which will be ready for demonstration in the summer of 1954.

Sept. 4—OPS authorizes producers of pig iron to raise ceiling prices by $2.50 a ton for pig iron containing less than 5 per cent silicon.

Drought Threatens Aluminum

A drought in the Pacific Northwest is threatening aluminum production. The Bonneville Power Authority must cut power generation because the Columbia river is low. Aluminum Co. of America and Kaiser Aluminum & Chemical Corp. fear loss of production before long.

Sept. 5—Auto manufacturers plan to step up production in the final quarter this year to 1.2 million cars, the highest for that quarter since before 1936, with the single exception of 1950.

STEEL FOR STALIN
. . . Russia claims expansion

Raise Steel Prices

Sept. 10—Effective today, General Overriding Regulation 35 permits manufacturers to pass through cost increases for steel, pig iron, copper and aluminum. Producers may add all increased materials costs to ceiling prices, but no price increases for higher wage costs are planned. Industry men feel that OPS penalizes industries requiring much manpower.

Sept. 14—NPA drops its allocation program for pure tungsten and molybdenum as supplies are now sufficient for all needs.

Expansion's End in Sight?

Sept. 15—NPA will remove some restrictions on construction by Apr. 1, 1953, since the industrial expansion program is over the hump.

Members of the Gray Iron Foundry Industry Advisory Committee, meeting with OPS, brand the pass-through price formula as "utterly insufficient."

Sept. 22—Zinc is slashed to 13.5c a pound, East St. Louis, equalling the year's low. Weakness in zinc reflects competition by foreign producers.

An increase of 10 million tons of coke for 1953 is called for by Charles W. Connor, Defense Solid Fuels administrator.

National Steel Corp. places into operation two blast furnaces adding about 1 million tons to annual pig iron capacity. One is at Zug Island, Mich., the other at Weirton, W. Va.

Sept. 24—Steel output in 1953 is likely to reach the second highest level in history, slightly below the 1951 high, B. E. Estes, director of commercial research for U. S. Steel Corp., predicts.

Sept. 26—Machine tool shipments in 1952 will reach $1.2 billion, the largest since 1942, the National Machine Tool Builders Association believes.

Sept. 29 — Steel production last week was the highest in history, AISI says. Production of ingots and castings rose to 2,160,000 tons, 104 per cent of capacity.

Inland Steel Co. pours the first steel from the second of four new open hearth furnaces at East Chicago, Ind.

Sept. 30—Ralph Howe, chief of Metalworking Equipment Division, NPA, urges government support for the machine tool industry.

OCTOBER

Oct. 1—Defense Mobilization Chief Henry H. Fowler believes it is impracticable and undesirable to abandon CMP before July 1, 1953.

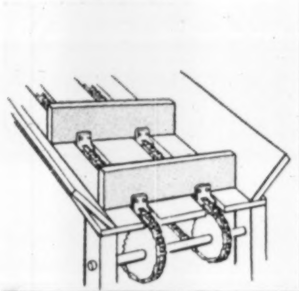
Oct. 5—Defense Mobilizer Henry Fowler states that half of the industrial expansion projects aided by fast tax write-offs will be completed by the end of 1952. Total valuation of the projects is $24 billion.

Reveal Russian Production

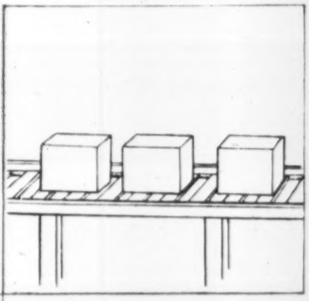
Oct. 6—Statistics of Russian industrial production are revealed. They are close to what had been expected. Output in 1952 includes 35 million tons of the steel ingots, 25 million tons of pig iron, 27 million tons of rolled steel products, 300 million tons of coal and 117 million kilowatt hours of electric power.

The Army announces that a team

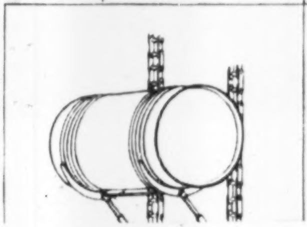
it needs a "Handle"!



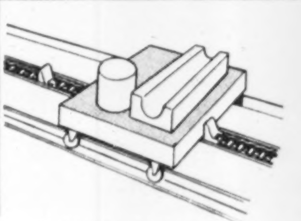
A Drag Conveyor



A Slat Conveyor



A Vertical Conveyor



A Pusher Conveyor

● Instead of costly, manual "push-pull-carry" methods, a modern materials handling system, such as an economical chain conveyor, is the answer to the problem of high non-productive costs. The complete Chain Belt Company line of conveyor chains and attachments can materially cut the non-productive costs incurred in transporting raw and finished materials to and from initial storage...through manufacturing and on to finished stores or shipping. They permit control of production and delivery schedules because they assure a regular flow of materials along assembly lines. They shorten production time per unit and eliminate the waiting time which usually results from irregular material flow.

Chain conveyors usually eliminate the need for wide aisles and the necessity for extensive storage space around machines or processing stations. Chain conveyors increase safety by reducing congestion in aisles... by doing the heavy lifting and hauling mechanically. They are lower in maintenance costs as compared to other types of handling equipment...reduce cost of direct repairs and maintenance...eliminate need for storage quarters.

Why not investigate the complete Chain Belt line of chain conveyors and attachments for your operations? The informative booklet "Build Profits by Cutting Handling Costs" will give you the story. Send for your copy. Chain Belt Company, 4660 West Greenfield Ave., Milwaukee 1, Wis.

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Oct. 7—AISI reports purchase of manganese from Africa, Asia and Latin America has offset curtailed imports from Russia, once the largest supplier.

Pittsburgh Coke & Chemical Co. places into operation a battery of 35 coke ovens at its Neville Island, Pittsburgh, plant. Costing about $6 million the battery will boost the company's coke production 35 per cent.

Oct. 10 — Due partly to effects of the steel strike, deliveries of new domestic freight cars in September were 3762, compared with deliveries of 8533 cars in September, 1951.

Oct. 11—Ford Motor Co.'s Lincoln-Mercury Division moves its manufacturing and assembly operation from Detroit to Wayne, Mich.

Oct. 13—Inland Steel Co. opens a new iron ore mine near Crystal Falls, Mich., with an expected capacity of 200,000 tons mined annually.

Oct. 14—AISI says steel production in September was higher than in any previous 30-day month. Output totaled 9,030,000 net tons.

Oct. 16—Defense Mobilizer Henry Fowler announces a program to cut civilian consumption of critically-needed ferroalloy materials.

WSB Slashes Wage Hikes

Oct. 18—The Wage Stabilization Board votes to cut to $1.50 the $1.90-a-day pay increase negotiated by John L. Lewis for his soft coal miners, saying it would be inflationary. As a result, 375,000 miners begin a strike.

Oct. 21—Bethlehem Steel Co. is increasing pig iron production at Bethlehem, Pa., by 25 per cent.

Oct. 22—DPA sets an expansion goal for selenium, calling for 1.1 million pounds production annually in 1955. This is an increase of almost 250,000 pounds over 1950 output.

Pouring at Fairless

Ceremonies mark pouring of first steel from this open hearth at U. S. Steel Corp.'s Fairless Works, near Morrisville, Pa. Steel pours into a 200-ton ladle as Benjamin F. Fairless, chairman of the board, and other U. S. Steel executives watch. Carol Fairless, granddaughter of Benjamin Fairless, pushed a button starting the flow

E. I. duPont de Nemours & Co., Wilmington, Del., is now producing titanium in ton loads.

Oct. 24—Machine tool shipments totaled $110 million in September, the highest in ten years.

Oct. 27—The coal strike has been called off by John L. Lewis.

More Steel for Autos

Oct. 28—Auto makers are promised extra steel for the first quarter, 1953. NPA says 1,480,000 extra tons of steel will be available for civilian goods and the motor industry will get its fair share.

Oct. 30—DPA sets two expansion goals to boost American aluminum sheet and plate capacity.

The nation's industrial production in September reached the highest point since 1945, the Federal Reserve Board reports.

Oct. 31—In recognition of easing of steel supply, DPA removes cold-drawn carbon bars, semifinished steel, plate, hot-rolled bars and seamless tubing from the "most critical" category.

NOVEMBER

Nov. 3—Department of commerce figures show fewer idle workers in October than in any other month since 1945. Total of unemployed was 1,284,000.

Eisenhower is Victor

Nov. 5 — Results from yesterday's election pour in, showing a national landslide for Dwight D. Eisenhower.

Nov. 6—Most industrialists expect better days under President-elect Eisenhower. OPS officials see little hope for extension of price controls beyond Apr. 30, 1953, expiration date now set by Congress.

Automakers are granted an additional 336,950 tons of steel for the first quarter, 1953, by DPA. This is part of the extra ration announced Oct. 28.

Nov. 7 — Aluminum producers, alarmed by increasing shortages, urge the government to stop stockpiling the metal.

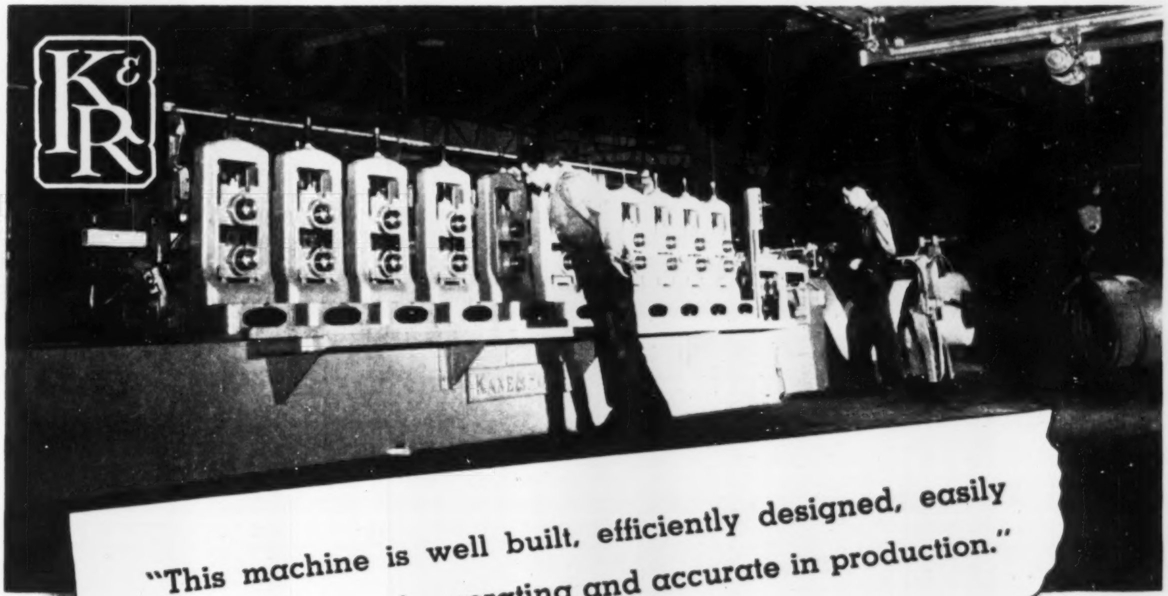
Nov. 9—Philip Murray, CIO president, 66, dies at San Francisco.

Nov. 11—NPA eases inventory restrictions on steel, copper and aluminum.

Nov. 12—In the annual meeting of the National Machine Tool Builders Association, at White Sulphur Springs, W. Va., manufacturers call for progressive decontrol of the industry.

Nov. 17—David McDonald is named acting president of the United Steelworkers of America, and is considered to have the inside track to winning the position permanently. An acting head was named to help the union use its weight more effectively in December's battle for the CIO presidency.

The Atomic Energy Commission says successful hydrogen bomb tests were held at Eniwetok proving grounds in the Pacific, Nov. 1.



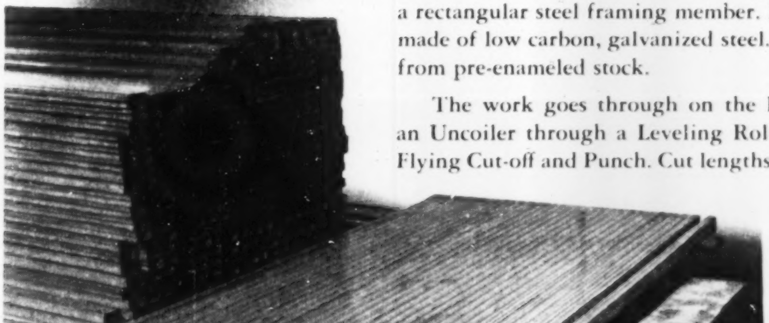
"This machine is well built, efficiently designed, easily adjusted, smooth operating and accurate in production."

writes Mr. W. F. Hinkle, Director, Engineering Division, Acme Steel Co.

ACME STEEL

Yes, Mr. Hinkle is perfectly satisfied to stamp "Acme Steel" on products rolled on a K&R Cold Roll Forming Machine. The section rolled here is a rectangular steel framing member. It measures 1⅜" x 2⅝" x .047 thick, made of low carbon, galvanized steel. The machine also forms this section from pre-enameled stock.

The work goes through on the K&R machine pictured above, from an Uncoiler through a Leveling Roll equipped with Pull-out Rolls to a Flying Cut-off and Punch. Cut lengths then pass into the Forming Machine.



Punching and shearing are both done at once — cutting and punching holes in the trailing end of one piece and the lead end of the next. Flat strip sheets on which this has been done are shown at left.

Machine consists of 11 forming stands on a 12-stand base — allowing for addition of another stand if needed later on.

✓ Learn how a K&R Forming Machine can cut costs and up production in your plant . . . write or wire today for engineering consultation.

66 Years of Metalworking Experience Built into K&R Machines:

Cold Roll Forming Machines
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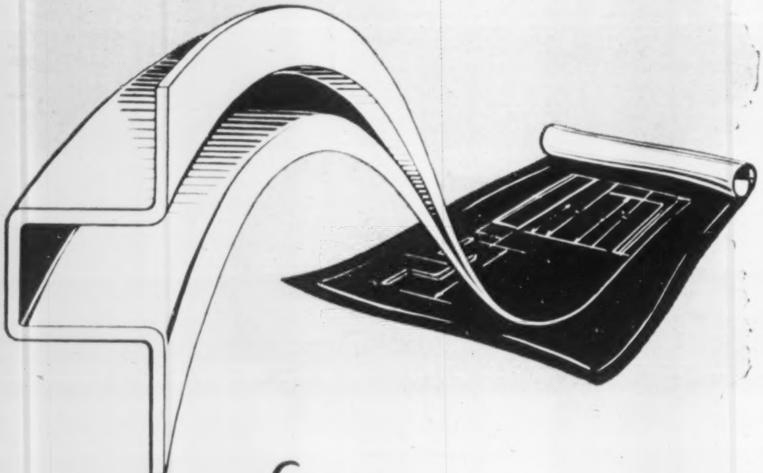
INCORPORATED
Syracuse, New York
Established 1887

Now BATH
WILL STRETCH-FORM
your intricate metal shapes



Any { METAL
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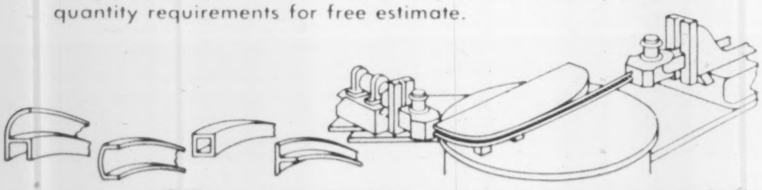
QUANTITY

Complex metal shapes required by modern aircraft production can be stretch-formed to exacting tolerances. Jet flange rings, shrouds, cases, flame tubes, stiffeners and casings in either full circles or segments can be produced from the new tough alloys developed for jet aircraft.

In addition, Bath stretch-forming technique provides increased strength with reduced weight. Forming single or compound curves, constant or varying radii, and bends of more than 360°, this process produces complex parts in single piece.

Let Bath's 10-years' experience in forming aircraft components aid you in the production of difficult parts. Send blueprints and quantity requirements for free estimate.



THE CYRIL BATH COMPANY

6972 Machinery Avenue • Cleveland 3, Ohio

IKE'S APPOINTEES
. . . *Wilson, Humphrey in cabinet*

Nov. 18—NPA says it will allow 40 per cent of machine tool output to go to civilian industries henceforth, instead of the former amount of 30 per cent.

High Post for Wilson

Nov. 20—Charles E. Wilson, president of General Motors, is chosen secretary of defense for President-elect Dwight Eisenhower. Harlow H. Curtice becomes acting GM president.

Nov. 21—William Green, president of the American Federation of Labor, dies at 82.

Nov. 22—George M. Humphrey, Cleveland industrialist, is named secretary of the treasury in the new administration's cabinet.

Nov. 24—DPA's Production Policy Committee meets to consider plans for gradual decontrol, while retaining the nucleus of CMP.

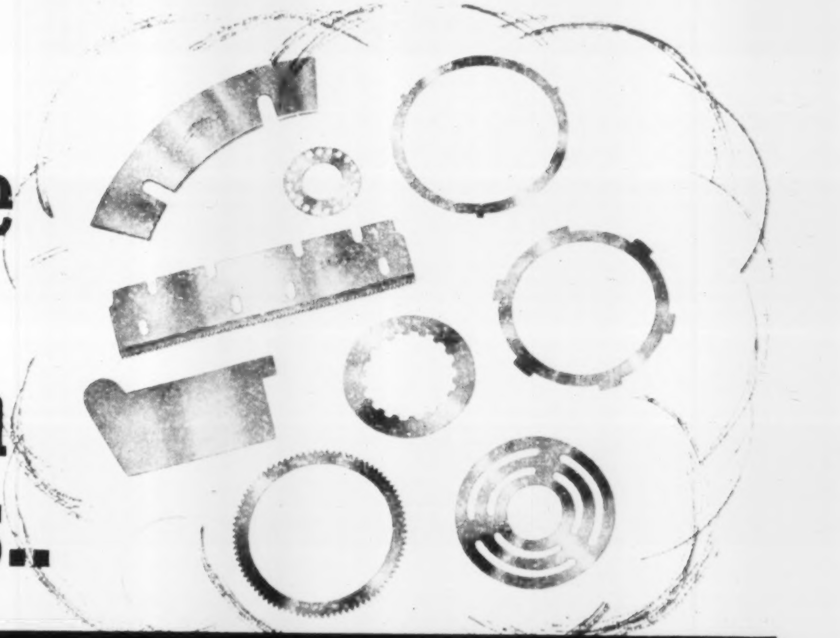
American Federation of Labor's Executive Council elects George Meany union president.

New Officers at U. S. Steel

U. S. Steel Corp. elects Clifford F. Hood president, to succeed Benjamin F. Fairless, who retains the chairmanship and continues as chief executive officer.

Nov. 26—Steel mill yards bulge with a record 6.8 million net tons of scrap, as producers hope last winter's shortage will not be repeated.

If Parts Like These are Production Headaches..



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- Valve Discs (Compressors)
- Clutch Discs (Multiple Disc Type)
- Aircraft Engine Discs
- Machine Parts (Flat Steel)
- Wear Plates (Ways, etc.)
- Blades — All types — plain — toothed — beveled (For cutting or scraping)
- Circular Cutters for all types of cutting
- Irregular Shaped Cutters — All types
- Heat Treated Liner Plates
- Rectangular Plates — All types

If you're having difficulty manufacturing (or obtaining) any *FLAT STEEL PARTS* . . . especially parts that require heat treating and grinding . . . then here's your headache powder

Simonds Special Parts Division can be your production line for these parts . . . raw steel from Simonds Steel Mill in Lockport, N. Y., fabricated into your part at Simonds Famous Windowless Plant in Fitchburg, Mass.

Simonds Special Parts Division is fully equipped to produce precision parts for aircraft engines, printing presses, slitting machines, air compressors and numerous other applications. Clutch discs for coal handling equipment, machine tools, marine transmissions, etc., is another Special Parts Division item. Send your inquiries, with full specifications or blueprints, direct to Simonds Special Parts Division, Fitchburg, Massachusetts.

SIMONDS
SAW AND STEEL CO.
FITCHBURG, MASS.

Factory Branches in Boston, Chicago, San Francisco and Portland, Ore.
Canadian Factory in Montreal, Que.
Simonds Divisions: Simonds Steel Mill, Lockport, N. Y.,
Simonds Abrasive Co., Phila., Pa., and Arvida, Que., Canada

DECEMBER

Dec. 1—Dwight Eisenhower nominates labor leader Martin P. Durkin of Washington to be secretary of labor in his cabinet.

Dec. 2—At the meeting of American Society of Mechanical Engineers in New York, members say giant presses for forgings and extrusions running up to 50,000-tons capacity are already showing great time and dollar savings in aircraft production.

Coal miners await raise of $1.90 a day. The Wage Stabilization Board has recommended a raise of $1.50 daily.

PENNSYLVANIANS STARTLED
. . . *Fairless plant amazes*

Dec. 4—Walter P. Reuther, president of United Automobile Workers, is elected president of the CIO after a bitter battle with Allan Haywood and others.

Dec. 5—Department of Commerce figures show dollar outlays for construction during the first eleven months of 1952 totaled $29.8 billion, making nearly certain that 1952 will set a record for money spent on building.

WSB Splits Over Pay Raise

Dec. 6—Seven industry members of WSB resign in protest to the wage hike granted soft-coal miners.

Some Youngstown steelmen are studying plans for piping ground-up coal 35 miles from East Liverpool, O., to Youngstown. Hydrocoal Transportation Co., newly formed, would build the pipe line.

Ore Shipments Miss Goal

Dec. 9—Lake Superior Iron Ore Association reports total lake shipments of iron ore this year were 74,910,798 tons. The steel strike idled ships 55 days, losing an estimated 24 million tons. Original goal for the year was 96 million tons, but following the strike a goal of 75 million tons was set.

Department of Defense, in a stretchout of defense goals, orders cutbacks in tank and truck production, starting within several months. Some large arms plants may be shut down.

Dec. 10—U. S. steel mills produced 9,446,000 net tons of raw steel in November, a new record for that month and the second largest total for any month, AISI says.

NPA cuts restrictions on apartment house building, effective Jan. 1, and more automobile production will be allowed in the second quarter of 1953. Their action results from improved prospects for steel and copper supplies in 1953.

Light Fairless Furnace

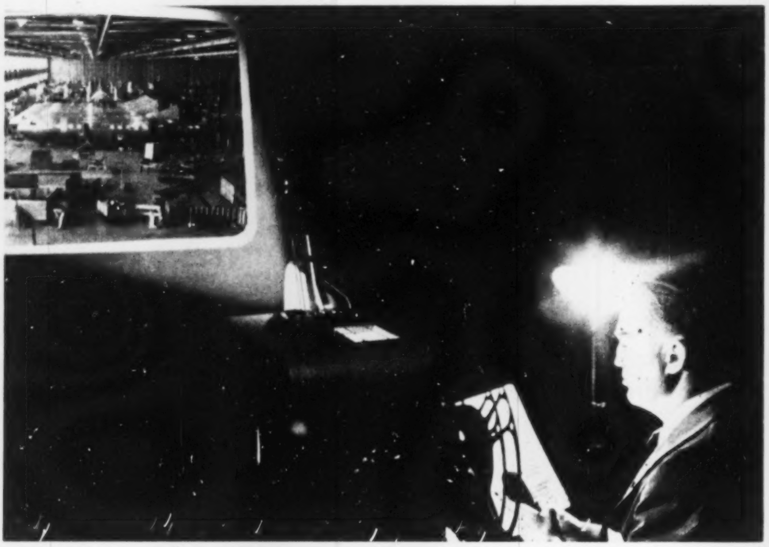
The immense $450 million Fairless Works of U. S. Steel Corp., Morrisville, Pa., begins operation with the lighting of one of two blast furnaces and the tapping of an open-hearth furnace. Officials predict iron and steel production will rise to 1.8 million tons annually when complete operation begins.

Dec. 15—Most steel experts forecast profitable operation in 1953, as 1952 draws to a close. Some steel orders may fall off by June, 1953.

Capital expansion will reach a record $28.7 billion seasonally-adjusted annual rate in the first quarter, 1953, industrialists predict.

Dec. 16—President Truman names Michael V. DiSalle to succeed Roger Putnam as chief of Economic Stabilization Administration.

Dec. 17—Auto manufacturers think production controls will be ended after the first quarter, 1953, with open competition following.



Manufacturers Become Movie Makers

Motion pictures of company operations increase plant efficiency in the opinion of Consolidated Vultee Aircraft Corp., San Diego, Calif. Above, B. F. Coggan, San Diego division manager, adds narration to a newsreel. Films of fabrication and assembly departments, final assembly lines and exterior plant areas are studied by executives to improve plant layout and solve production problems

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- Phoenix Metal Master
- Phoenix "A" Alloy Steel
- Phoenix "A" Special Alloy Steel
- Carbon Steel

does

coil-itis *

have your

processing

tank production

off its feed?

When the appetite for work of your heating and cooling processes diminishes, the trouble may well be coil-itis. For, downtime due to pipe failures and limitations can seriously delay your production flow. Switch to Platecoils, the new tonic for production, as revolutionary as the new wonder drugs. Platecoils take 50% less tank space leaving more room for greater payload. They heat or cool 50% faster. They simplify maintenance and save hours of downtime. Equally important, Platecoils cost as much as 50% less in the first place. Platecoils cure production troubles involving heat transfer and give production a shot in the arm.

Write for Bulletin P72 today!

PLATECOILS SAVE 50% IN HEAT TRANSFER COSTS

PLATECOILS ELIMINATE A 6-TO-8 HOUR-A-DAY CHIPPING JOB

At Sealed Power Corp., installation of Platecoils has completely eliminated a 6-to-8 hour-a-day chipping job. Three Platecoils now heat a tank that previously took 4 pipe coils. Ask about other case histories.

PLATECOIL

REPLACES PIPE COILS

*

Coil-itis — Diagnosed as tank heating and cooling problems. **Platecoils** — the prescription for solving pipe coil problems.

PLATECOIL DIVISION, KOLD-HOLD MANUFACTURING CO., LANSING 4, MICHIGAN

(*Continued from Page 498*)

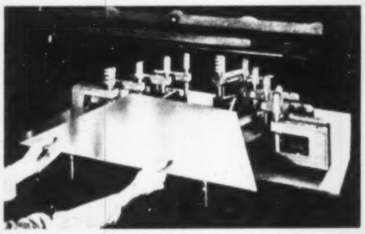
hour, removing 0.020-inch maximum stock per surface. Tolerance of 0.015-inch for flatness is maintained. Gardner Machine Co., Dept. ST, Beloit, Wis.

USE REPLY CARD—CIRCLE No. 17

Positive Die Retainer

. . . dies slip-fit in holders

Positive die retainer and simplified interchangeable die removal method is available for the type CJ hole punching units. Development permits interchangeable dies to slip-fit in the holders and to be fastened into position by a threaded pilot pin. It is tightened or removed with a hex wrench.



Each hole punching unit consists of a holder that carries punch, die and stripping mechanism. This independent, self-contained design eliminates necessity of attaching punch to press ram and assures permanent alignment of punch and die. Wales-Strippit Corp., Dept. ST, 345 Payne Ave., N. Tonawanda, N. Y.

USE REPLY CARD—CIRCLE No. 18

Semiautomatic Coil Bender

. . . fits production line needs

This semiautomatic machine for serpentine coil bending is built to fit production line needs. Bender has a single control lever, a stationary bending form, rotating wiping shoe and semicircular table to maintain long coils in a

USE A REPLY CARD

Just circle the corresponding number of any item in this section for more information.

Yours FOR THE ASKING

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71. Induction Motors

Allis-Chalmers Mfg. Co.—Description of standard construction features and types of construction of large pedestal-bearing induction motors is offered in 4-page illustrated bulletin 05B7771. Motors can be furnished for any practical horsepower, speed, voltage and frequency in ratings above 1 hp per rpm.

72. Radial Air Compressors

Worthington Corp.—Radial two-stage air-cooled air compressors which have piston displacements of 142 to 538 cfm of air in the 80-125-psi pressure range are covered thoroughly in 12-page illustrated bulletin H-630-B1. Bare, base-mounted V-belt drive, base-mounted flexible-coupled and Unabloc close-coupled compressors are shown and specifications given.

73. Precision Lathes

South Bend Lathe Works—Three models of Light Ten bench lathes for precision work are subject of 8-page well illustrated catalog L-10AE. Lathes feature 12-speed horizontal motor drive providing 12 spindle speeds from 48 to 1435 rpm. Specs and features are given, and attachments and accessories are listed.

74. Tachometer Heads

Metron Instrument Co.—Descriptive of series 57M heavy duty tachometer heads, technical data sheet No. 57M tabulates range and applications of these units which are designed for measuring low speeds, either rotational or linear. They combine built-in gearing, protective enclosure to exclude dirt and moisture, and ability to produce direct reading.

75. Elevating Tables

Raymond Corp.—Having capacity of up to 2000 lb, line of portable elevating tables detailed on 2-page bulletin 232 includes standard and telescopic models with lifts of 16 and 22 in. respectively. These caster-mounted tables are ideal for machine feeding, stock and die transfer and other similar operations. They are powered by foot actuated hydraulic pump.

76. High Speed Steel

Latrobe Steel Co.—"Electrite HV-6" is title of 4-page illustrated technical data section which lists analysis, hardening properties, available forms and other information on this Desegatized high speed steel.

77. Rotating Parts Tester

Warren Brothers Roads Co., Warren Brothers Mfg. Div.—Spintesting, the rotation of a part at very high speeds to check for mechanical perfection and vibration characteristics, is described and the equipment for it is illustrated in 4-page bulletin. Three models are covered, specs are given, and turbine rotor testing procedure is outlined.

78. Jig Borer

Niles-Bement-Pond Co., Pratt & Whitney Div.—4-page illustrated circular 550 on the No. 1E P&W jig borer which is available with 12 x 24-in. and 12 x 42-in. tables and travels of 18 and 36 in. respectively. These machine tools feature the Electrolimit measuring system which permits readings accurately within 0.0001-in.

79. Hydraulic Duplicators

Turchan Follower Machine Co.—Basic advantages of converting standard machine tools to operation by hydraulic tracer control are outlined in this 16-page illustrated bulletin "Hydraulic Duplicators." How they work, what they can do, typical installations, descriptions of various models and other data are included.

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80. Fork Lift Trucks

Towmotor Corp. Thinking of buying a fork lift truck? Before you do you should send for this enlightening 8-page booklet D.M.F.-2 which describes some of the engineering details of Towmotor trucks. Among subjects covered are the air-cooled clutch, compact transmission, slip type universal joint, drive axle, brakes, steering, tires, mast and pumping equipment.

81. Tool & Die Salvage

Eutectic Welding Alloys Corp. 64 pages packed with practical information on how to effect "Tool and Die Salvage Welding" comprises an illustrated manual of this same title. In addition to outlining procedures step-by-step, it gives complete data on available types of low temperature welding alloys and their application.

82. Lathes & Grinders

Rivett Lathe & Grinder, Inc. Data for your machine tool files can be found in this 8-page illustrated bulletin 500F which covers a complete line of cabinet, hand turret and toolroom lathes and internal and universal grinders. Detailed descriptions, specs and worksaving methods are outlined for these machines.

83. Steel Strapping

Signode Steel Strapping Co. Eight illustrated pages of useful information about safe shipping through better packaging protection and freight bracing are found in "The Signode Seal." How various steel mill products make use of steel strapping in packaging and shipping is the theme. Case histories show how others have saved up to $50,000 annually.

84. Liquid Strainer

Golden-Anderson Valve Specialty Co. Applications, working pressures and dimensions of Ideal liquid strainers are some of the useful information presented in 2-page illustrated data sheet W-6. A copy is yours for the asking.

85. Boiler Tube Corrosion

Babcock & Wilcox Co., Tubular Products Div. Corrosion as a major factor in shortening the life of boiler tubes is discussed in an 8-page illustrated article TR-514. It points out various types and causes of corrosion and offers general rules to follow to obtain maximum service life from boiler tubing.

86. Forging Furnace

Delaware Tool Steel Corp. Principle of operation and design features of Forgeatrol furnace are outlined in 6-page illustrated bulletin DF-2. Cold shank heating is possible in furnaces which have even heating from wall to wall. Models available and specifications of each are included.

EDITORIAL REPRINTS:

87. Mill Roll Finishing

Development of special machine for superfinishing of mill rolls for stainless steel results in 40 per cent reduction in machine cycle time, more production per roll and reduction in buffing requirement for finishing sheets. Machine is described by M. B. Hanks of Gisholt Machine Co. in STEEL reprint "Special Machine Improves Stainless Roll Finish."

88. Shell Molding

A wealth of practical information about the shell molding process has accumulated from development work at International Harvester Co. This data replaces speculation with operating experience. G. P. Phillips, company's general supervisor summarizes much of experience gained in STEEL reprint entitled "Shell Molding Data Grows."

89. Jet Parts Manufacture

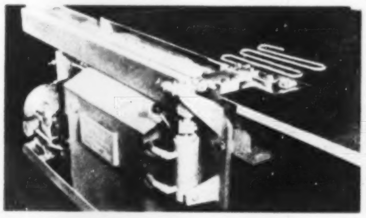
Manufacturing methods used in turning out jet engine parts are shifting from one-at-a-time techniques to high production methods. Special machines are doing the job, and critical floor space and labor are being saved. J. A. Logan of Solar Aircraft Co. gives the story in STEEL reprint "Manufacturing Shift Slashes Production Time."

90. Continuous Casting

Joint development work conducted by Republic Steel Corp. and Babcock & Wilcox Co. aims to reduce some present steps and costs in making steel products. In STEEL reprint "Continuous Casting Makes Steady Progress" are discussed six fundamental factors the control of which constitutes success in the use of this method. A commercial stainless plant may be started by end of 1953.

horizontal position during bending cycle sweep.

One movement of operating lever initiates the entire clamping and bending cycle. Production averages 450 bends per hour. Machine handles tubing up to 1-inch OD, 16-gage and 5 feet long. Die height from floor is 35 inches. Machine employs the compression bending principle. Pines Engineering Co. Inc., Dept. ST, 601 Walnut St., Aurora, Ill.



USE REPLY CARD—CIRCLE No. 19

Surface Finishing Machine

. . . glazes, mirrors hand tools

Modified surface finishing machine, the model 206-A, is employed specifically for finishing hand tools. Size of hydraulic reservoir is increased 50 per cent to provide better cooling, less frequent additions of hydraulic fluid. Optional V-belt drive of spindle permits variable surface speeds. Clair Mfg. Co., Dept. ST, 1019 S. Union St., Olean, N. Y.

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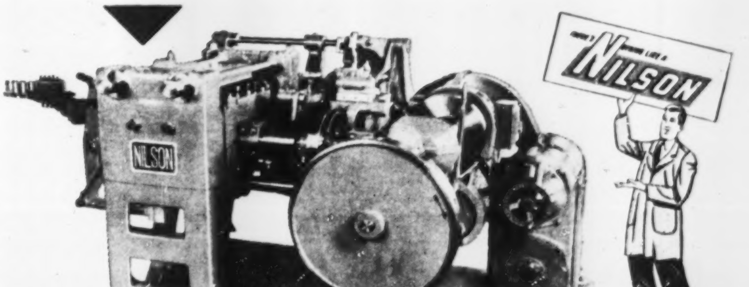
Wire and Ribbon Metal FORMING MACHINE

Lowers your costs by more efficient production of wire and small metal stampings.

Follow the leadership of other alert manufacturers who are reducing tooling and operation costs with versatile automatic NILSON 4-SLIDES.

Available in a wide range of sizes to form wire 1/32″ to 1/2″ diameter and up to 3-1/2″ wide ribbon stock.

For specific recommendations, send prints or samples of your operation, when requesting bulletin.



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Automatic Chain-Making Machines • Automatic Staple Forming Machines • Wire and Stock Reels • Foot Presses • Wire Straightening Equipment • Slide Feeds for Presses

# of the 19 most recently HARBISON-WALKER Refractories

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HARBISON-WALKER BLAST FURNACE REFRACTORIES

BENEZET BF and HW Ky. BF—for many years, the standard refractories for most blast furnaces—for hearth and bosh, inwall and top linings. Harbison-Walker's research program has continued to improve these standard quality products as well as to lead in the development of the super-duty classes.

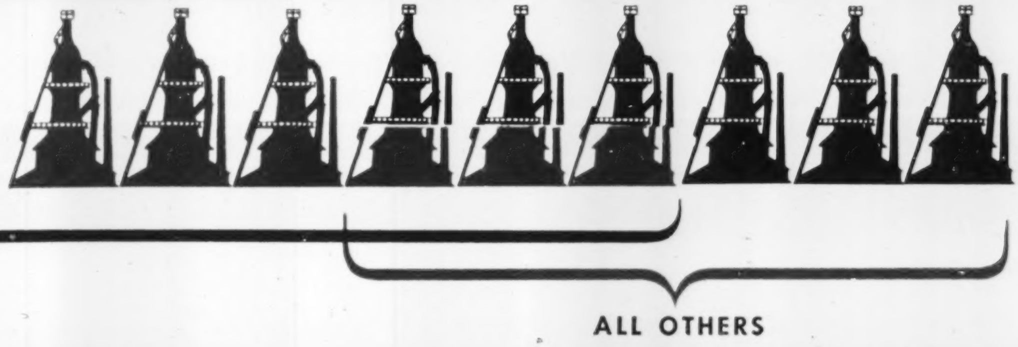
H-W 18 Pa. and H-W 18 Ky.—hard burned, high duty fireclay brick. Exceptionally resistant to abrasion, and to disintegration by carbon monoxide. H-W 18 brick are low in permeability and porosity, have high mechanical strength and excellent volume stability at working temperatures.

VARNON BF—extremely hard-fired, super-duty fireclay brick, having high strength and density, low porosity and permeability, immunity to disintegration by carbon monoxide, high refractoriness and resistance to slagging.

BONDING MORTARS—Harbison-Walker produces Bonding Mortars especially suited for every blast furnace need. Included in these are the highly plastic HW BOND B and HW IMMUNITE hot-set mortars and HARWACO BOND cold-set cement. The best results are secured with the proper selection of these mortars according to the service requirement.

completed Blast Furnaces

are used in 16 !



Outstanding preference for Harbison-Walker Blast Furnace and Stove Refractories is expressed in *orders* by the companies who produce the bulk of the nation's iron. Their choice is based upon long experience with Harbison-Walker products.

During the recent expansion of iron-making facilities, nineteen new blast furnaces have been built or are now nearing completion. In all but three of these, Harbison-Walker refractories are used!

Through continuous research and engineering development, Harbison-Walker has provided new and improved refractories to meet the iron and steel maker's increasing demands, and today, Harbison-Walker brands include the types and classes that will serve *best* for every requirement.

HARBISON-WALKER REFRACTORIES COMPANY
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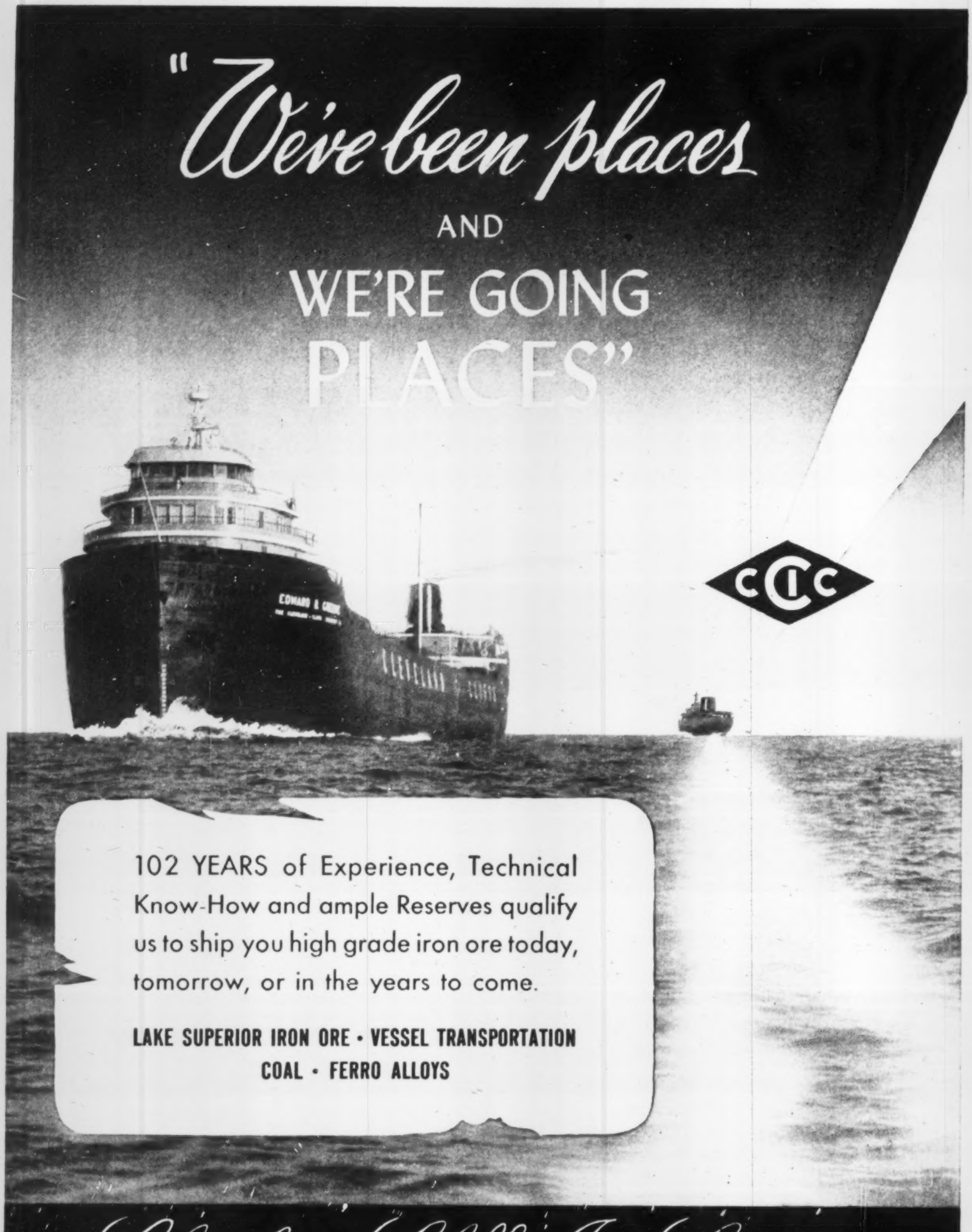

"We've been places AND WE'RE GOING PLACES"

102 YEARS of Experience, Technical Know-How and ample Reserves qualify us to ship you high grade iron ore today, tomorrow, or in the years to come.

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COAL • FERRO ALLOYS

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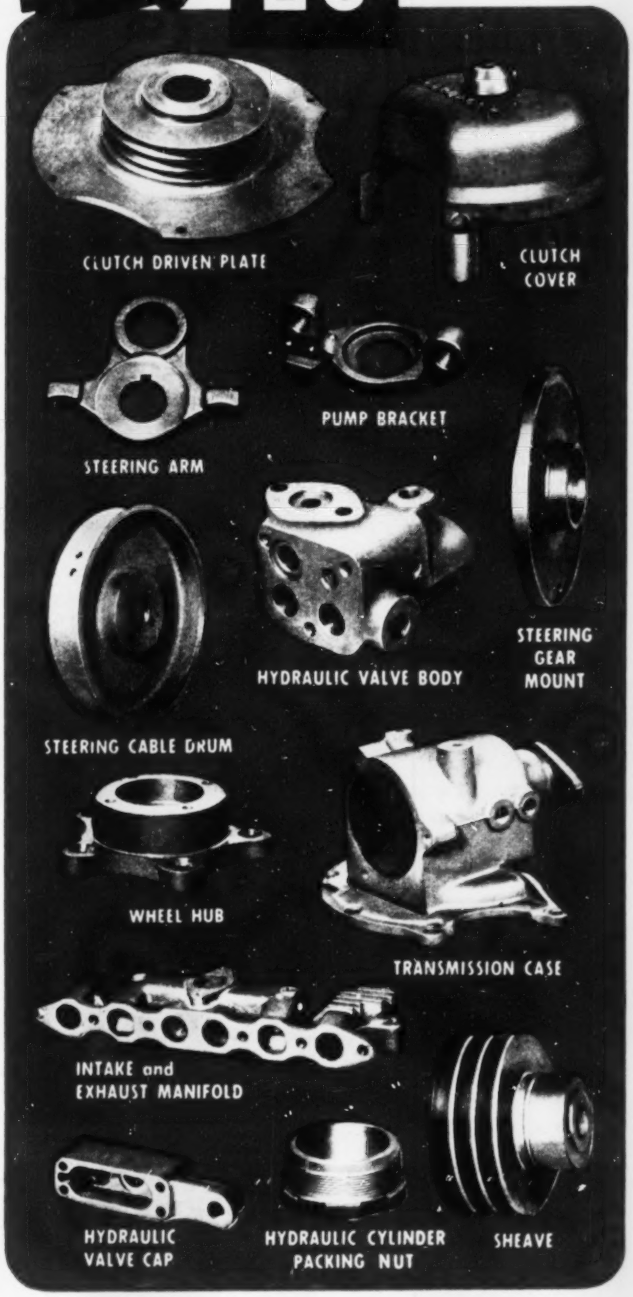
Fig. 1

23 MEEHANITE Castings in this HiDUTY Lift Truck



TRANSITIER Truck Co., Portland, Oregon, specify 23 important cast components in their line of HiDuty Lift Trucks (Fig. 1) in Meehanite metal. The importance of these parts is further emphasized by the fact that in recent months a number of them have been redesigned from original steel and bronze specifications. In addition to the ones shown, the following parts are Meehanite castings:

1. **WHEEL SPACER**
2. **HYDRAULIC VALVE BODIES(2)***
3. **CLUTCH DRIVEN PLATE**
4. **CLUTCH SUPPORT**
5. **TRANSMISSION CASE**
6. **BRAKE DRUM**
7. **WHEEL HUB(1)***
8. **HYDRAULIC CYLINDER PACKING NUT (2)***

**In addition to similar parts shown.*

The design and specification of these components is a good example of the beneficial results of team work between a foundry manufacturing high property, high quality castings, and a manufacturer alert to the possibilities of incorporating dependability into his product through proper specification. The use of Meehanite castings provides a sure knowledge that both service and production requirements will be met regularly and repeatedly.

Write for our new Bulletin 35 "Meehanite Castings Serve all Industry."

Take *YOUR* Casting Problem To A MEEHANITE FOUNDRY

American Brake Shoe Co	Mahwah, New Jersey
The American Laundry Machinery Co	Rochester, New York
Atlas Foundry Co	Detroit, Michigan
Banner Iron Works	St Louis, Missouri
Barnett Foundry & Machine Co	Irvington, New Jersey
E W Bliss Co	Hastings, Mich and Toledo, O
Builders Iron Foundry	Providence, Rhode Island
Compton Foundry	Compton, Calif
Continental Gin Co	Birmingham, Alabama
Crawford & Doherty Foundry Co	Portland, Oregon
The Cooper Bessemer Corp	Mt Vernon, Ohio and Grove City, Pa
De Laval Steam Turbine Co	Trenton, New Jersey
Empire Pattern & Foundry Co	Tulsa, Oklahoma
Farrel Birmingham Co., Inc	Ansonia, Connecticut
Florence Pipe Foundry & Machine Co	Florence, New Jersey
Fulton Foundry & Machine Co., Inc	Cleveland, Ohio
General Foundry & Manufacturing Co	Flint, Michigan
Greenlee Foundry Co	Chicago, Illinois
The Hamilton Foundry & Machine Co	Hamilton, Ohio
Hardinge Company, Inc	New York, New York
Hardinge Manufacturing Co	York, Pennsylvania
Johnstone Foundries, Inc	Grove City, Pennsylvania
Kanawha Manufacturing Co	Charleston, West Virginia
Lincoln Foundry Corp	Los Angeles, California
London Concrete Machinery Co., Ltd	Brantford, Ontario
E Long Ltd	Orillia, Ontario
Otis Elevator Co., Ltd	Hamilton, Ontario
Palmyra Foundry Co., Inc	Palmyra, New Jersey
The Henry Perkins Co	Bridgewater, Massachusetts
Pohlman Foundry Co., Inc	Buffalo, New York
Rosedale Foundry & Machine Co	Pittsburgh, Pennsylvania
Ross Meehan Foundries	Chattanooga, Tennessee
Shenango-Penn Mold Co	Dover, Ohio
Sonith Industries, Inc	Indianapolis, Ind
Standard Foundry Co	Worcester, Massachusetts
The Stearns-Roger Manufacturing Co	Denver, Colorado
Traylor Engineering & Mfg Co	Allentown, Pennsylvania
Valley Iron Works, Inc	St Paul, Minnesota
Warren Foundry & Pipe Corporation	Phillipsburg, New Jersey

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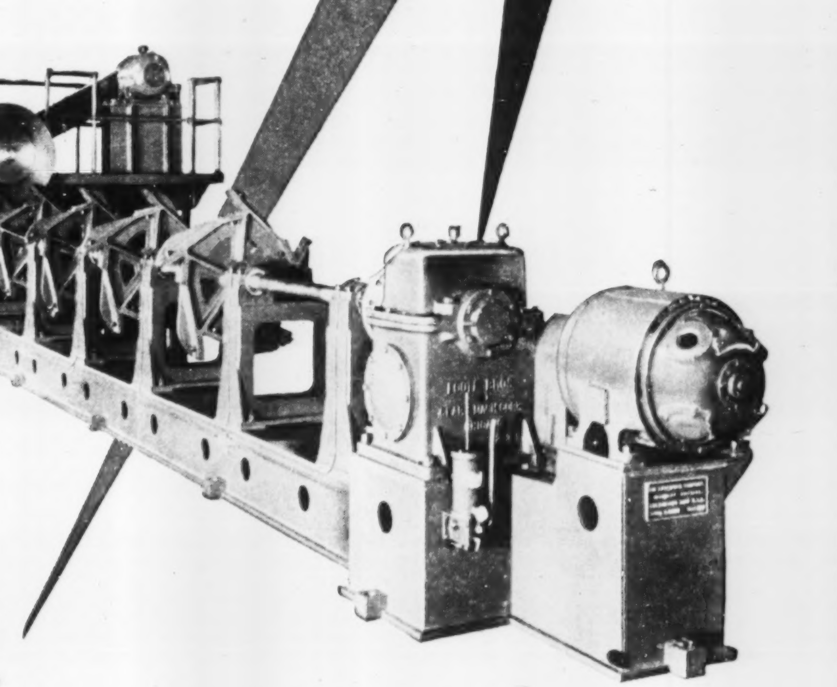
Providing the sinews to bite through steel

Transmitting power to shear through steel pipe requires a drive of rugged strength. The Foote Bros. Hygrade Worm Gear Drive selected for this service provides the maximum in quality and high efficiency due to advanced engineering — improved design — new techniques in manufacture and better control of material.

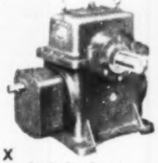
Whatever your requirements in enclosed gear drives, you will find one just suited to your needs in the complete Foote Bros. line. A size and type of drive for every need.

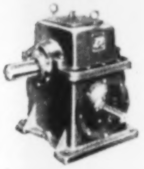


Crop End Saw built by The Enterprise Company, Columbus, Ohio, for National Tube Division of United States Steel Company.

HYGRADE A COMPLETE FAMILY OF ENCLOSED DRIVES

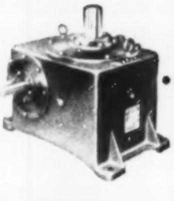
TYPE S
Horizontal right angle worm gear drive. Ratios up to 71 to 1. Cap. up to 266 h.p.

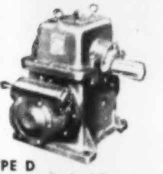




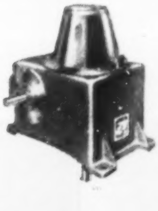
TYPE X
Right angle helical — worm gear drive. Ratios up to 196 to 1. Cap. up to 71 h.p.

TYPE V
Vertical right angle drive, output shaft up, down, or both. Ratios up to 4108 to 1. Cap. up to 216 h.p.





TYPE D
Horizontal double worm gear drive. Ratios up to 4108 to 1. Output torque to 253,000 in. pounds.



TYPE VW
Hytop vertical right angle drive for long, unsupported output shaft extensions. Same ratio and capacity range as TYPE V.

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FOOTE BROS. GEAR AND MACHINE CORPORATION
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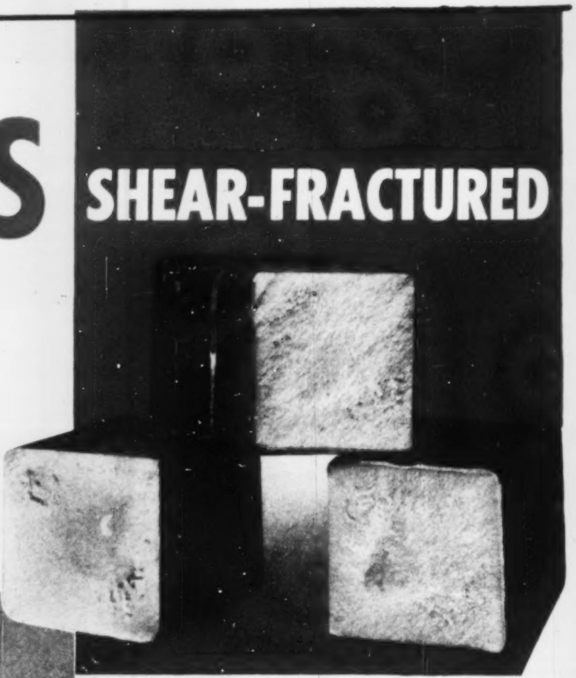
"Buffalo" *Tips on Better SHEARING - (Shear - Fracture)*

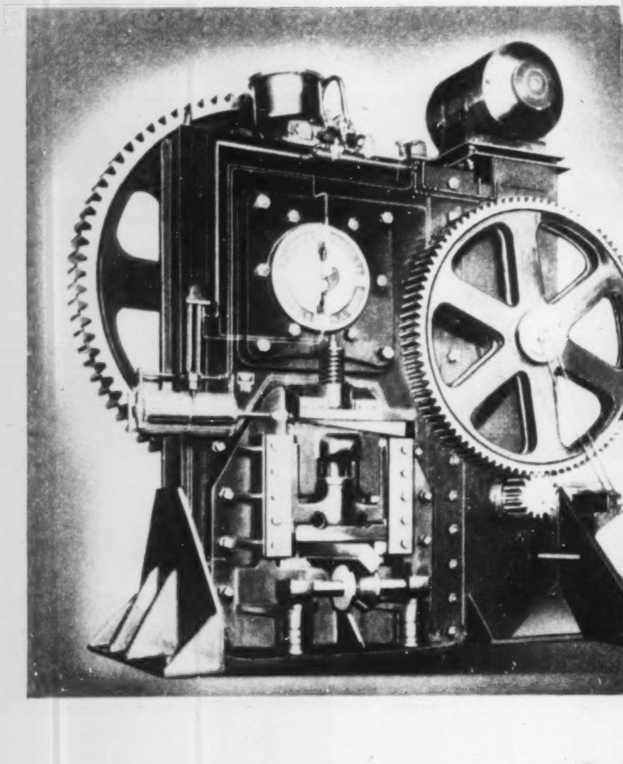
BILLETS SHEAR-FRACTURED



Faster, Cleaner

than by

NICKING and BREAKING



- No "smearing" or notches on edge, as in nicking and breaking
- Porosity in the metal can be easily detected in sheared pieces
- Shear-fractured pieces are kept to uniform weight
- High speeds reduce your costs, and you eliminate burner and gas expense

5½" Squares of S. A. E. 1035 STEEL cut at the rate of 10 pieces per minute. Speed like that means low cost per cut! And there are 10 other "Buffalo" models to handle the rounds, squares or flats in your shop. Write for Bulletin 3295-B today for complete details on low-cost shearing.

"Buffalo" MACHINE TOOLS

DIAMOND JUBILEE 75TH ANNIVERSARY

BUFFALO FORGE COMPANY

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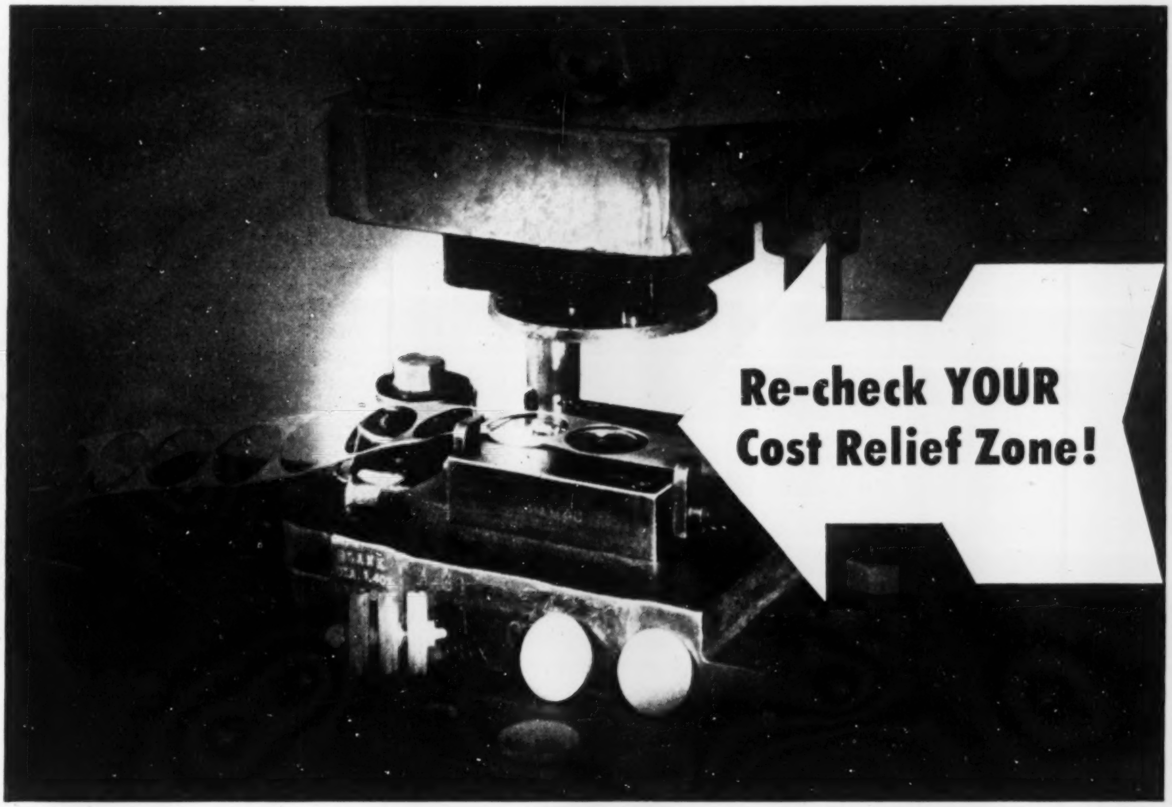
DRILLING PUNCHING SHEARING CUTTING BENDING



Here's a Challenging Opportunity for Every Man Responsible for Tooling and Production

Your *tools* and *dies* represent an immediate opportunity to bring unit costs down to a reasonable level. A quick re-check of this vital cost zone can result in definite savings. Sometimes these savings show up in less die finishing or adjusting. Or in longer runs with less downtime for regrinding. Many times they come about through a drastic reduction in the *number* of tools and dies you make each year.

Actual job records in plant after plant *prove* these cost economies can be realized. A good example is the job shown above. A re-check of these dies, used to blank and form .008" thick bronze thermostat diaphragms, showed that a different steel with better wearing qualities was needed to reduce excessive downtime for regrinding. This steel, Carpenter Hampden (Oil-Wear), eliminated *11* hours of machine downtime each week and produced over a half-million *extra* diaphragms per grind!

Certainly, if other plants are finding new output and production savings by re-checking their tools and dies, you can too. First step is to use The Carpenter Matched Set Method to select the one steel best suited for your job. By so doing, you back your selection with really dependable Carpenter Matched Tool and Die Steels. Then a call to your nearest Carpenter Mill-Branch Warehouse or Distributor brings fast delivery from stock. THE CARPENTER STEEL COMPANY, 139 W. BERN ST., READING, PA.

Are You Missing These Opportunities In Your Cost Relief Zone?

- Less die finishing and adjusting
- Greater output between grinds
- Fewer heat treating failures
- Less machine downtime

On Job After Job Carpenter Matched Tool and Die Steels Have Made Them Possible!

The Standard Tool Steels of Industry

Carpenter STEEL

Matched Tool and Die Steels

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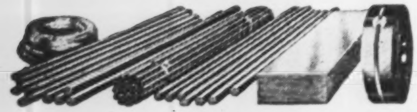
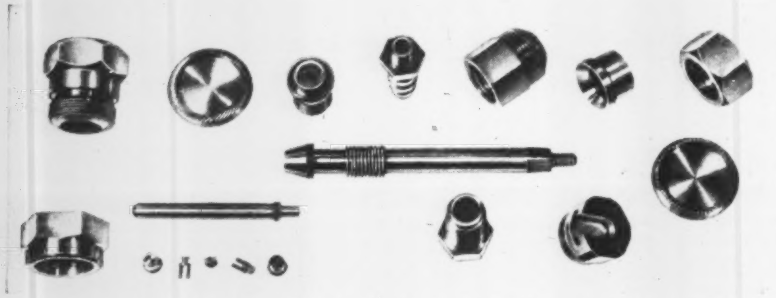


BRIDGEPORT BRASS COMPANY

COPPER ALLOY BULLETIN

"Bridgeport" MILLS IN BRIDGEPORT, CONN. AND INDIANAPOLIS, IND.—IN CANADA: NORANDA COPPER AND BRASS LIMITED, MONTREAL



A variety of parts for engineering applications made from brass rod on automatic screw machines. Courtesy Waterbury Screw Machine Products Company, Waterbury, Connecticut.

Brass Rod for Screw Machine Products

Few materials possess the many desirable physical and mechanical properties found in copper-base alloys. For example, free-cutting brass rod has superior machinability over other metals. Other useful properties are excellent resistance to wear, abrasion and fatigue; high electrical and thermal conductivity; low magnetic permeability and general fine corrosion resistance.

The versatility of the copper-base alloys is illustrated by their broad range of mechanical and physical properties brought about by changes in composition and temper. Consequently copper-base alloys easily fulfill requirements for high strength and hardness.

The widespread use of the copper-base alloys is also due to their combined properties: resistance to wear; excellent cold and hot working properties; minimum wear on tools; ease of soldering, brazing, welding; and facility of finishing, polishing, plating, lacquering.

In addition, copper-base alloys are exceptionally attractive from a natural color standpoint—from the reds of copper and bronze, rich golden colors of red brass, yellows of yellow brass and the silvery-white of nickel silver. Combined with the property of taking on superior finishes, these rich, inherently beautiful colors partly explain their use in such decorative products as jewelry, lamps, giftware, leather goods ornaments, clocks, desk ornaments, hardware, etc.

Copper and most copper-base alloys are strongly resistant to corrosion from such agents as moisture, the atmosphere, salt water, certain acids, alcohols, petroleum products and many chemical solutions. This explains their wide use for fittings and plumbing goods, water systems, valves, heating and air conditioning, electrical transmission equipment, and many other applications.

What Alloy Should Be Used?

For most automatic screw machine operations, free-cutting brass rod similar to Bridgeport Ledrite 6 (copper 61%, lead 3.4%, zinc remainder) is used because it has a machinability rating of 100. It is only when other considerations than excellent machinability are called for, that the designer turns to other copper-base alloys.

Copper and each of its alloys have individual characteristics as to ductility, hardness, tensile strength, type of chip produced, etc. Metal to be machined must be rigid enough to stand up against the turning tool without distortion. This requires a certain amount of hard temper in the rod—the smaller the rod, the harder the temper. Ledrite 6 in various sizes and shapes is made in the temper which will take care of about 90% requirements. Where additional ductility is needed for deep knurling or spinning, a specially annealed or a softer temper than standard Ledrite 6 can be supplied, or brass rod with a lower lead content, such as Ledrite 2, Medium Leaded (copper 63%, lead 1.8%, zinc remainder), which is more ductile, may be needed.

Coolant-Lubricant

Speed of machining is limited by many factors, principal among which is the great heat generated at the point of contact of the tool and the work. This heat must be carried away by the coolant-lubricant and to some extent by the chip itself. The efficiency of the coolant-lubricant will affect the temperature of the work and the tool. Such factors as the shape of the tool, its sharpness and depth of cut will affect the manner and speed with which the chip is carried away from the tool and this in turn also controls the temperature of the work and the tool.

With free-cutting alloys, and even with some of the moderately machinable alloys, the chip breaks up at a rapid rate and is only in momentary contact with the tool. This calls for a cutting medium whose principal function is that of a coolant, with very little regard for lubrication. Rake angles as well as clearance can be held to a minimum. The small rake angle breaks the chip almost immediately and the reduced clearance provides greater support for the tool's cutting edge.

Please contact our nearest sales office for problems involving out of the ordinary requirements. Write for the Bridgeport Brass "Technical Handbook," which contains detailed information on available copper-base alloys for screw machine operations as well as machining data.

(9309)

BRIDGEPORT BRASS COMPANY
COPPER ALLOY BULLETIN CONTINUED JANUARY, 1953

CAUSES OF CORROSION

This article is one of a series of discussions by C. L. Bulow, corrosion metallurgist of the Bridgeport Brass Company.

ALLOY COMPOSITION vs. SOLUTION COMPOSITION

The mass of data covering the effect of variations in copper alloy composition and solution composition shows that these differences may have a minor to a profound effect on the rate of corrosion. Attempts to rationalize on this subject without experimental data can only lead to erroneous conclusions. One cannot correlate the extent of corrosion with the pH value alone.

Sodium Hydroxide vs. Ammonium Hydroxide

The difference in the corrosiveness of sodium hydroxide and ammonium hydroxide has been measured. The results of water line tests conducted in 2N solutions of sodium hydroxide and ammonium hydroxide are given in the table. The pH values were maintained by frequent replacement with fresh solutions.

The penetration based on loss in weight covers the submerged area from the water line to the bottom of the specimen. The penetration at the water line was calculated from the loss in tensile strength. This primarily shows the effect of the high concentration of oxygen in this zone. Corrosion of copper alloys is generally most severe at the water line.

An increase in zinc content in the copper-zinc alloys resulted in a slight decrease in corrosion resistance in the sodium hydroxide solution. In ammonium hydroxide solution, the lowest corrosion rate occurred in the brass containing 85-90% copper.

The high rate of corrosion obtained in the ammonium hydroxide is due to the higher solubility of copper and its alloys and their corrosion products in this medium. Note that the corrosion rates in the ammonium hydroxide are from 3.8 to 172 times greater than those obtained in sodium hydroxide solution.

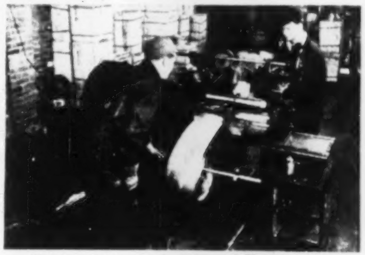
These corrosion rates show that the copper-zinc alloys are suitable for use in 2N sodium hydroxide solutions but are not in ammonium hydroxide solutions.

CORROSION OF COPPER AND COPPER-ZINC ALLOYS
IN 2N SODIUM HYDROXIDE SOLUTIONS (pH 14.1)

Versus 2N Ammonium Hydroxide Solutions (pH 11.8)

	Penetration Based on Loss in Weight		Penetration Based on Loss in Tensile Strength*	
Alloy	Sodium Hydroxide**	Ammonium Hydroxide***	Sodium Hydroxide**	Ammonium Hydroxide***
99.9% Cu, 0% Zn	0.00082 ipy	0.0862 ipy	0.00129 ipy	0.222 ipy
90% Cu, 10% Zn	0.00171 ipy	0.0707 ipy	0.00318 ipy	0.122 ipy
85% Cu, 15% Zn	0.00175 ipy	0.0704 ipy	0.00249 ipy	0.161 ipy
80% Cu, 20% Zn	0.00174 ipy	0.126 ipy	0.00318 ipy	0.171 ipy
70% Cu, 30% Zn	0.00193 ipy	0.100 ipy	0.00239 ipy	0.322 ipy
65% Cu, 35% Zn	0.00225 ipy	0.257 ipy	0.00329 ipy	0.558 ipy
60% Cu, 40% Zn	0.00252 ipy		0.00398 ipy	[illegible]

*at water line. **for one year at 80°F ± 5°F. ***for 49 days at 80°F ± 5°F.


Slitting strip metal at one of Bridgeport's warehouses.

Warehouse Slitting Service Makes Customers' Stocks More Flexible

Bridgeport warehouses in principal cities across the country make every effort to carry the variety of alloys, sizes and gages which meet the requirements of the localities they serve.

Slitting equipment has been installed at most Bridgeport warehouses. Slitting service not only provides the benefit of the maximum range of widths of strip metal carried in the warehouse but also is available to slit the customers' own stocks.

Bridgeport's Warehouse Stocklist carries weight tables and a technical digest giving the properties of the most popular copper-base alloys. If you do not have a copy, ask your nearest Bridgeport office.

NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

Adjustable Multispindle Drill Head is reported to be flexible for any pattern of holes. Available with from 4 to 12 spindles, head features aluminum housing, thrust bearings and integral spindle gears. One model has range of 0 to 1/4-in. and full range of collets. Second model has 3/16 to 1/2-in. range with No. 1 Morse taper sockets or chucks for straight shank drills. **No. 1273**

Power Punch Press with 24-in. deep throat is rated 175 strokes per minute. Stroke is 2-in. Machine has nonrepeat clutch which can be released for automatic feed. Press is reported to have 5 ton safety factor and affords high margin of operator safety since flywheel is in rear. **No. 1274**

Variable Grip Vise is said to grip all shapes and contours. Has a gang of serrated or plain steel fingers, each independently slidable toward or away from its opposing member. On release, jaws open slightly without disturbing the contour so that next piece can be gripped without realignment. Available in 9 and 12 finger models. **No. 1275**

Sheet Metal Hole Puncher unit combines punch, die and stripper into two-piece assembly that is said to be readily fastenable to any type of plate press or press brake. Runs on AC and has die button assembly that permits use of compressed air to blast the punched slug from the die with each stroke. Built-in stripper spring employs pressfit principle of mounting punch into holder. **No. 1276**

Damaged Thread Chaser is said to be useful in on-the-job repairs to crossed and damaged threads in copper fittings. Chaser services threads in both male and female fittings and is turnable by hand, pliers or any type of wrench. Sizes and types available for all commonly used fittings. **No. 1277**

Carbide Tipped Center has red painted safety groove which indicates maximum amount of regrinding. Center inserts are sintered tungsten carbide, and centers are available in all Morse, Brown and Sharpe, Jarno, Hendy, ASA, Norton and Reed tapers and sizes as well as straight shanks. **No. 1278**

BRASS, BRONZE, COPPER, DURONZE, NICKEL SILVER, CUPRO NICKEL

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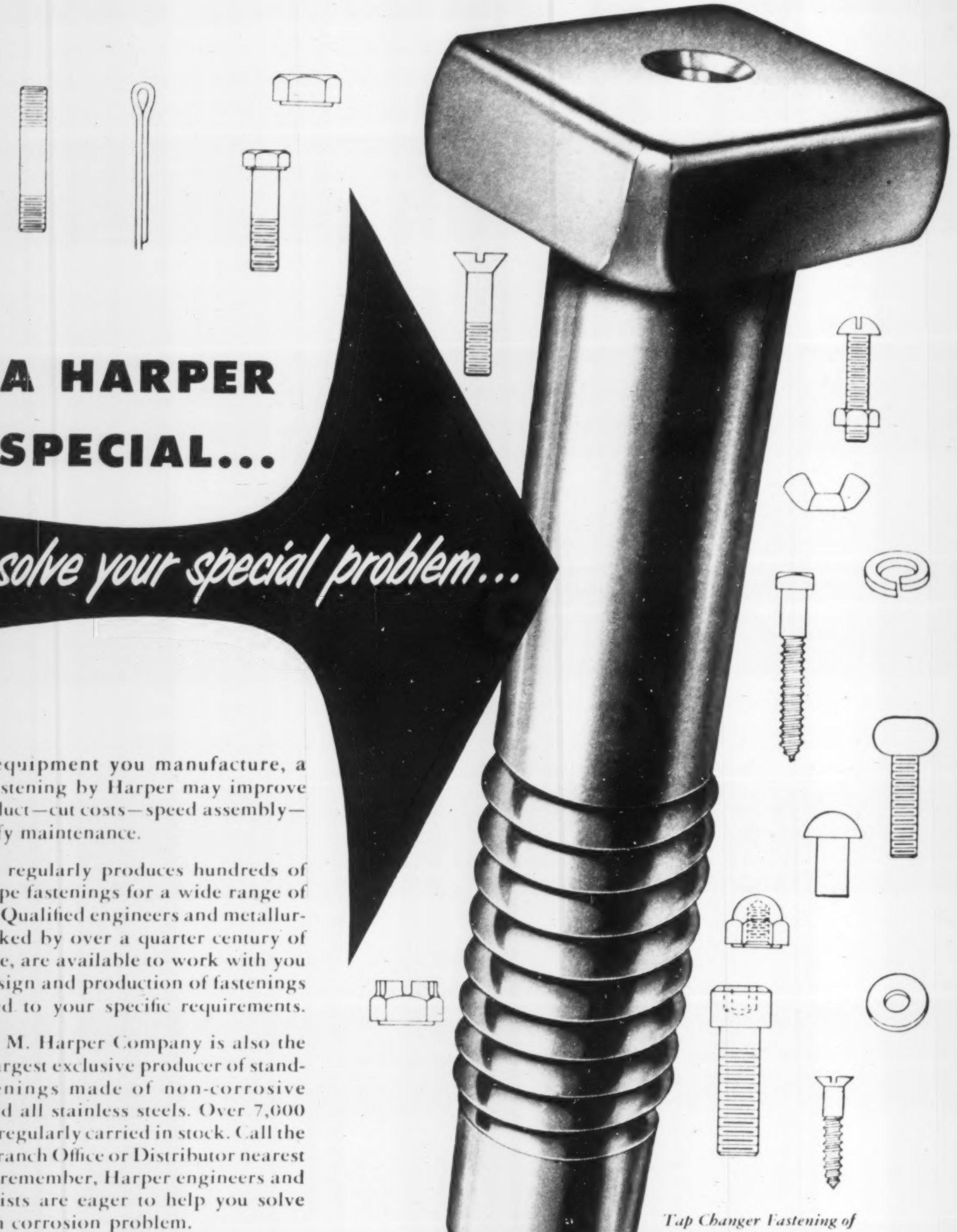

Tap Changer Fastening of Copper Used in Transformers

On the equipment you manufacture, a special fastening by Harper may improve your product—cut costs—speed assembly—or simplify maintenance.

Harper regularly produces hundreds of special type fastenings for a wide range of products. Qualified engineers and metallurgists, backed by over a quarter century of experience, are available to work with you on the design and production of fastenings engineered to your specific requirements.

The H. M. Harper Company is also the world's largest exclusive producer of standard fastenings made of non-corrosive metals and all stainless steels. Over 7,000 items are regularly carried in stock. Call the Harper Branch Office or Distributor nearest you. And remember, Harper engineers and metallurgists are eager to help you solve any tough corrosion problem.

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VANCORAM PRODUCTS

ALUMINUM ALLOYS

PRODUCT	TYPICAL COMPOSITION	APPLICATIONS
Alsifer	Aluminum 20% Silicon 40% Iron 40%	Used principally as a steel deoxidizer and for grain size control.
Deoxidizing Grades	Aluminum 85 to 99%	Standard grades.
Silicon Aluminum	Silicon 5 to 20% Aluminum Bal.	For sand, permanent mold and die casting.
Titanium Aluminum	Titanium 2½ and 5% Aluminum Bal.	For grain refinement and improved physical properties of commercial aluminum alloys.
Vanadium Aluminum	Vanadium 2½, 5, 10% Aluminum Bal.	For control of thermal expansion, electrical resistivity, and grain size of commercial aluminum.

BORON ALLOYS

PRODUCT	TYPICAL COMPOSITION	APPLICATIONS
Ferro Boron	Boron 14/18% Carbon 1.50% Silicon max. 5.00% Aluminum max. 0.10%	For adding boron to steels and irons.
Vanadium Grainal No. 1	Vanadium 25.00% Aluminum 10.00% Titanium 15.00% Boron 0.20%	Practical and economical intensifiers, for controlling and increasing the capacity of steels to harden, and for improving other important engineering and physical properties.
Grainal No. 79	Aluminum 13.00% Titanium 20.00% Zirconium 4.00% Manganese 8.00% Boron 0.50% Silicon 5.00%	

CHROMIUM ALLOYS

PRODUCT	TYPICAL COMPOSITION	APPLICATIONS
Ferro Chromium Briquettes	Hexagonal. Weigh approx. 3⅜ lb., contain 2 lb. of chromium.	A practical and convenient form for adding ferro-chromium to the cupola.
High Carbon Grade	Chromium 66/70% Carbon 4/6%	For wrought constructional steels and steel and iron castings.
Iron Foundry Grade	Chromium 62/66% Carbon 4/6% Silicon 6/9%	For alloyed cast irons. Ladle addition readily soluble at lower temperatures of cast iron.
Low Carbon Grades	Chromium 67/72% Carbon .06%, .10%, .15%, .20%, .50%, 1.00% and 2.00% max.	For low carbon chromium steels, especially those with high chromium content, such as stainless steels and heat-resistant types.
Low Carbon Ferrochrome-Silicon	Chromium 39/42% Silicon 40/42% Carbon max. 0.05%	Used in stainless steels to reduce chromium oxide from slag and to add chromium to steel.
Experimental Ferrochrome-Silicon Alloy	Chromium 48/52% Silicon 25/30% Carbon max. 1.50%	For simultaneous addition of chromium and silicon to low alloy steels and cast iron.

SILICON ALLOYS

PRODUCT	TYPICAL COMPOSITION	APPLICATIONS
Ferro Silicon Briquettes	Two sizes, both cylindrical. The smaller contains 1 lb. of silicon; the larger, 2 lbs. of silicon.	A practical and convenient form for adding ferro-silicon to the cupola.
25/30% Grade	Silicon 25/30%	To deoxidize open hearth steels and add silicon to cast iron.
50% Grade	Silicon 47/52%	To deoxidize and add silicon to steels and cast irons.
75% Grade	Silicon 74/79%	For high content silicon steels.
80/85% Grade 85/90% Grade 90/95% Grade	Silicon 80/84.9% Silicon 85/89.9% Silicon 90/95%	For high silicon addition to steel; for slag treatment and graphitization of iron; for making magnesium.
Silicon Metal	Silicon min. 96%	For making aluminum, other nonferrous alloys and silicones.

SPECIAL FOUNDRY ALLOYS

PRODUCT	TYPICAL COMPOSITION	APPLICATIONS
Graphidox No. 4	Silicon 48/52% Titanium 9/11% Calcium 5/7%	Graphitizer for high strength cast irons; reduces chill; supplementary deoxidizer for cast steel.
Noduloy No. 12	Magnesium 10.5/13% Copper 15/18% Silicon 37/41% Iron Bal.	Magnesium-containing alloys for addition to molten cast iron for manufacture of ductile (nodular) iron.
Noduloy No. 3	Magnesium 13.5/16.5% Silicon 62/67% Iron Bal.	
V-5 Foundry Alloy	Chromium 38/42% Silicon 17/19% Manganese 8/11%	To reduce chill and increase strength and hardness of cast iron.

TITANIUM ALLOYS

PRODUCT	TYPICAL COMPOSITION	APPLICATIONS
Ferro Titanium High Carbon Grade	Titanium 15/18% Carbon 6/8%	To control rimming action and deoxidize steel.
Medium Carbon Grade	Titanium 17/21% Carbon 3/4.50%	To deoxidize and to add titanium to killed steels.
Low Carbon Grades 25% Titanium	Titanium 20/25% Carbon max. 0.10% Silicon max. 4.00% Aluminum max. 3.50%	Carbide stabilizer in high chromium corrosion-resistant steels of extremely low aluminum content. Deoxidizer for some steels.
25/32% Titanium Special	Titanium 25/32% Carbon max. 0.10% Silicon max. 4.00% Aluminum max. 2.00%	Alloy of high titanium-to-aluminum ratio for adding relatively large amounts of titanium to stainless and heat-resistant steels.
40% Titanium	Titanium 38/43% Carbon max. 0.10% Silicon max. 4.00% Aluminum max. 8.00%	Carbide stabilizer in high chromium corrosion-resistant steels.

VANADIUM ALLOYS

PRODUCT	TYPICAL COMPOSITION	APPLICATIONS
Ferro Vanadium Iron Foundry Grade	Vanadium 38/42% Silicon 7/11% Carbon about 1%	Imparts remarkable improvement in physical properties of iron with no sacrifice of machinability.
Grade A (Open Hearth)	Vanadium 50/55% Silicon max. 7.50% Carbon max. 3.00%	For low vanadium steels and vanadium cast irons.
Grade B (Crucible)	Vanadium 50/55% Silicon max. 3.50% Carbon max. 0.50%	For tool steels and other high vanadium steels requiring a limited silicon addition.
Grade C (Primos)	Vanadium 50/55% 70/80% Silicon max. 1.25% Carbon max. 0.20%	For making the highest vanadium and the lowest silicon addition to tool steels.
Vanadium Metal 90% Grade	Vanadium 91.15% Aluminum 2.25% Silicon 0.50% Carbon 0.17%	For special iron-free (non-ferrous) or low iron alloys or low impurity ferrous alloys.
95% Grade	Vanadium 95.18% Aluminum 2.00% Silicon 0.27% Carbon 0.40%	Principally for research on the properties of pure alloys. For use in applications where very low iron content is essential.
Vanadium Pentoxide, Tech. Fused Form	V_2O_5 88/92%	A source of vanadium in basic electric furnace steels. A base for numerous chemical compounds.
Air-Dried Form	V_2O_5 83/85%	Base for chemical compounds.
Ammonium Meta Vanadate, Tech.	NH_4VO_3 min. 99%	For making sulphuric acid, synthetic organic compounds and vanadium chemicals.

Also special alloys, chemicals and metals of Aluminum, Chromium, Silicon, Titanium and Vanadium.

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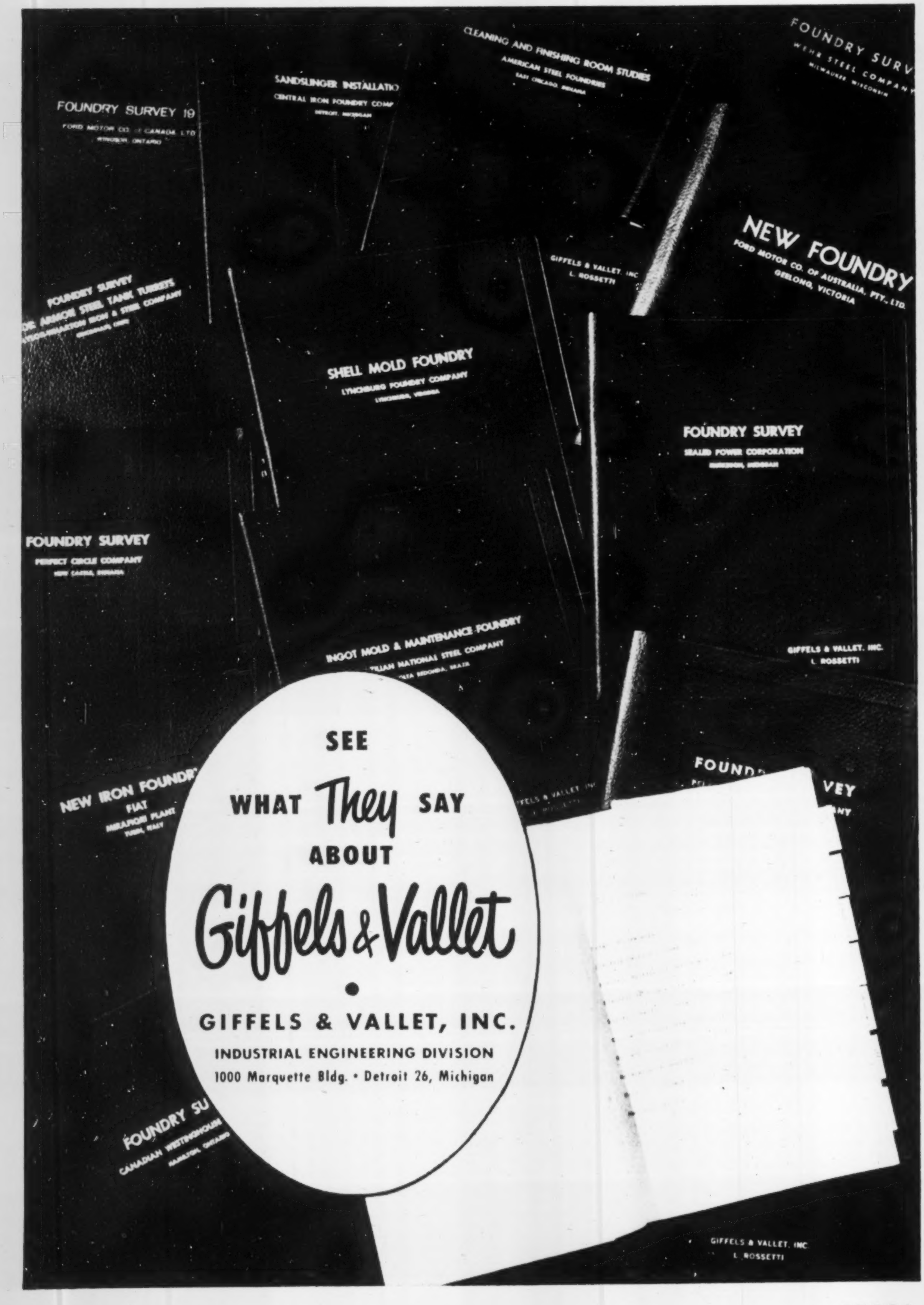
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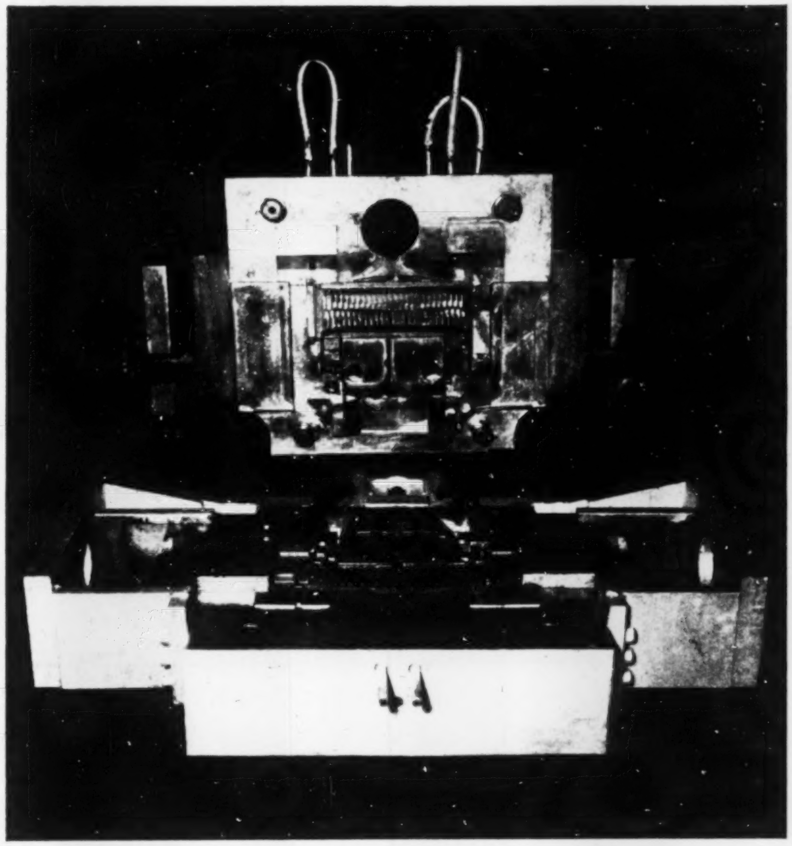

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is the title of a new, six-page folder that tells about the chromium, molybdenum, vanadium Hot Die Steel known as POTOMAC M—and also covers other grades for other hot-work operations. Secure your copy —*write today!*

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In the precision casting of aluminum, POTOMAC M Hot-Work Die Steel is especially favored as the material for die-casting dies because its properties help assure accuracy of the steel itself *after* heat treatment. Die makers have found that size changes are held to a minimum. Dimensional stability is thus the *first* contribution that POTOMAC M makes to accuracy.

Production accuracy of the die after it is in service is maintained also by the resistance of POTOMAC M to wear, to heat checking, and to metal wash.

Allegheny Ludlum makes a complete line of steels for hot-work tooling of various kinds—so, whether your need is the mass producing of duplicate parts or fabricating a few of them, call up or write "A-L" every time for hot-work counsel or service or both. Just tell us your requirements.

● *Allegheny Ludlum Steel Corporation, Henry W. Oliver Bldg., Pittsburgh 22, Pa.*

For complete **MODERN** Tooling, call

Allegheny Ludlum

W&D 3724

A-L FINE TOOL STEELS SINCE 1854

THE "DIAMOND" TEST . . . is a vital source of information about hard-to-weld metals. Here the operator measures the impression made by forcing a diamond point into a specimen . . . to determine the effect of a weld on the basic structure of the metal. Part of Airco's continuing research and development program — the micro-hardness test is another measure of the unseen "performance insurance" you buy with every Air Reduction product and process!

AT THE FRONTIERS OF PROGRESS YOU'LL FIND...

AIRCO®

OXYGEN • ACETYLENE • INDUSTRIAL AND RARE GASES • CALCIUM CARBIDE • WELDING SUPPLIES AND ACCESSORIES

"welding" a perfect tread...

AIRCOMATIC® inert gas welding once again demonstrates its ability to handle problem metals in this unique application. A prominent manufacturer of aluminum molds for recapping tires ran into "tread trouble" when attempting to cast tread lugs into the doughnut-shaped tire matrix. Clearance between lug and matrix left an unsightly rubber "fin" on the finished product. The Aircomatic process eliminated this problem with clean, non-porous welds . . . at the same time speeding production through its high-rate deposition of filler metal. No flux was necessary . . . no slag removal . . . minimum "clean-up" on the finished matrix.

And remember, when you need oxygen, acetylene, other industrial or rare gases, think of Air Reduction. A nation-wide distribution system is ready to supply your needs.

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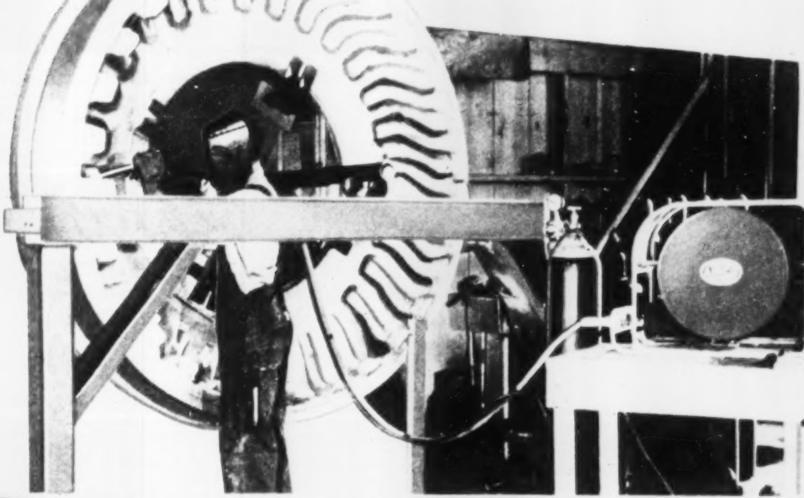

WELDING A GIANT TIRE MOLD WITH AIRCOMATIC

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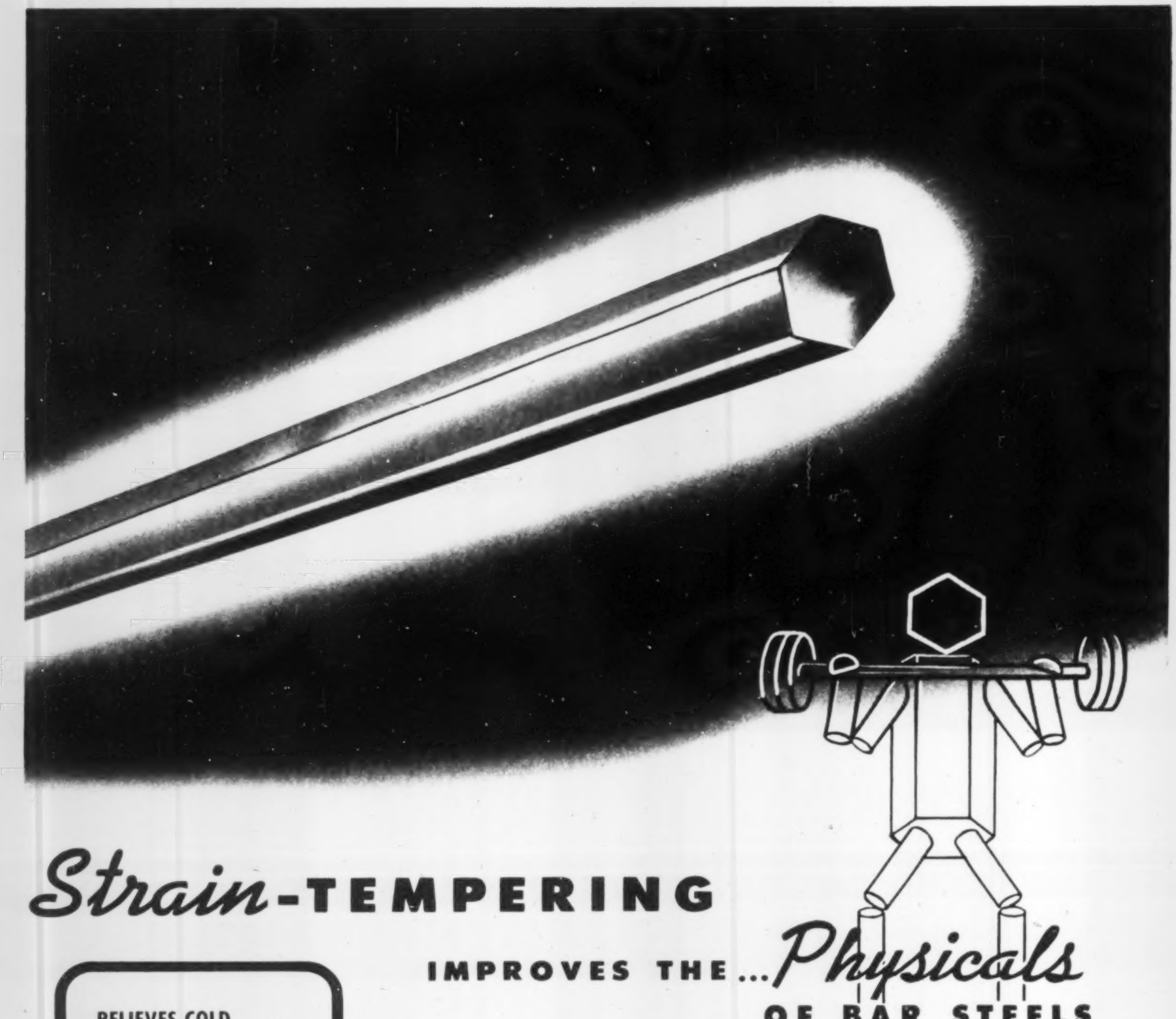

Strain-TEMPERING

IMPROVES THE... *Physicals* OF BAR STEELS

- RELIEVES COLD WORKING STRAIN
- MINIMIZES DISTORTION
- PROMOTES UNIFORMITY
- ELIMINATES HEAT TREATING
- INCREASES SERVICEABILITY

IF you are looking for short-cuts in production, just remember in ordering B&L Cold Finished Steels to specify *Strain-Tempered* Bars, whenever they are applicable.

Strain-Tempering is a controlled furnace treatment that pre-conditions the steel and modifies or develops the physical properties you require in your end-products.

As a result, you obtain a more workable steel . . . shorten production time . . . eliminate heat treating . . . insure uniform quality . . . and profit from extra economies in fabricating machine parts.

Let B&L engineers show you how to utilize Strain-Tempered Bars for simplifying your manufacturing operations.

BLISS & LAUGHLIN, INC.

GENERAL OFFICES: HARVEY, ILLINOIS

PLANTS: HARVEY, ILL. • BUFFALO, N. Y. • MANSFIELD, MASS.

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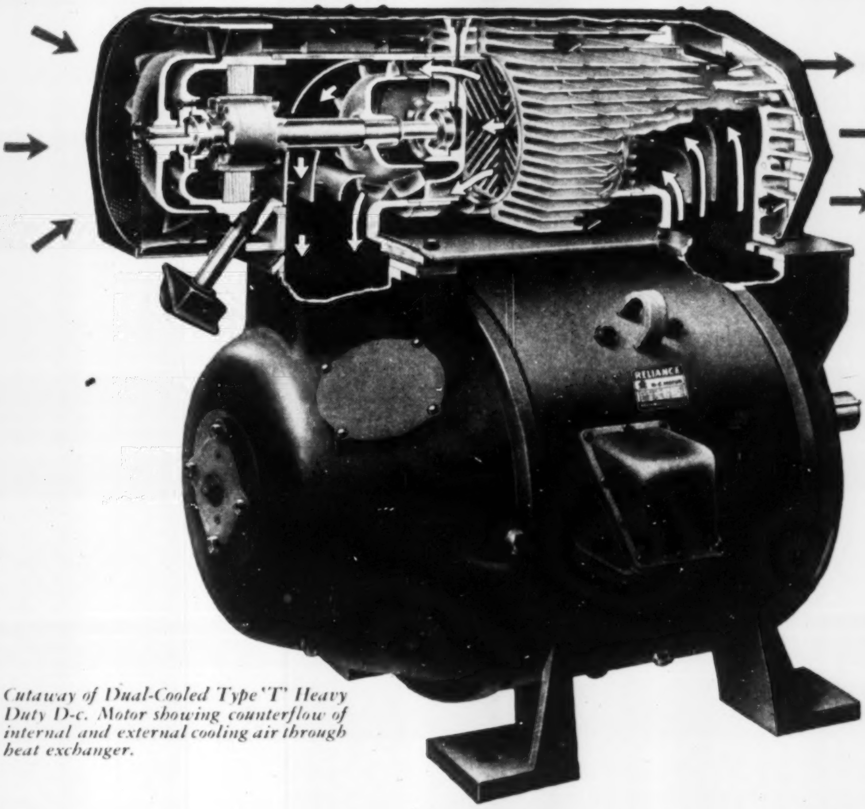
SALES OFFICES IN ALL PRINCIPAL CITIES

RELIANCE *Totally-Enclosed Dual-Cooled* D-C. MOTORS

PATENT APPLIED FOR



Cutaway of Dual-Cooled Type 'T' Heavy Duty D-c. Motor showing counterflow of internal and external cooling air through heat exchanger.

for Wider Speed Ranges . . . Higher Ratings

New Reliance Dual-Cooled Motors provide dependable totally-enclosed, fan-cooled operation over wider speed ranges and higher ratings than were ever before possible . . . and this is accomplished with floor-space savings of up to 30%!

Dual-Cooled Motors are completely enclosed . . . have two separate cooling systems operating independently of the motor speed. One system circulates high-velocity air within the motor, that is cooled in the finned inner duct of the heat exchanger. This heat is dissipated in the other system by air sweeping through the fins of the outer duct.

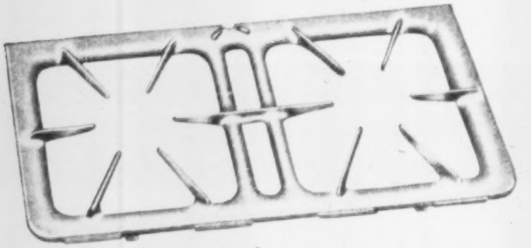
The Dual-Cooled Motor is especially adaptable to Reliance adjustable-voltage V*S Drive and is available in ratings from 15 through 150 horsepower. Explosion-proof Dual-Cooled Motors are available through 100 hp., in conformity with Underwriters and Bureau of Mines specifications.

Whatever your application . . . get further details from the nearest Reliance Sales Office . . . or write for Bulletin C-2201.

RELIANCE ELECTRIC AND ENGINEERING CO.

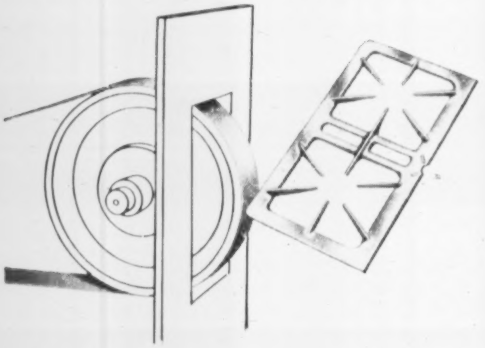
1081 Ivanhoe Road, Cleveland 10, Ohio • *Sales Representatives in Principal Cities*

How would you
SOLVE IT?

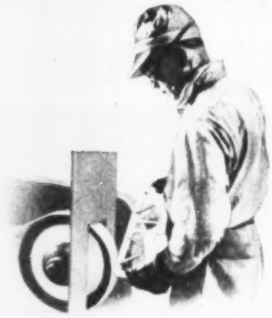


PRODUCTION PROBLEM: To cut unit costs of finishing stove top grids and produce a more uniform finish. (Manufacturer found conventional grinding wheel turned out only 50 units per hour, left unsatisfactory finishes, fatigued operators.)

1 A 3M Representative analyzed Mount Vernon Furnace Company's grinding and finishing operations, and made the following specific recommendation:



2 He advised this company to convert to the 3M Backstand Method using fast-cutting 3M Belts (#36 Three-M-ite resin bond, size 3" x 132") and special rubber contact wheel.



3 Now this Illinois manufacturer uses the 3M Method to turn out 100 grids an hour (twice as many as previous method!) with more uniform finishes. Grinding is safer. There's less operator fatigue. A 3M Representative can help you reduce your production costs, too. His services are available without cost or obligation.

WANT MORE INFORMATION?

Minnesota Mining & Mfg. Co.
Dept. ST13, St. Paul 6, Minn.

Return this coupon for additional facts on 3M Abrasive applications.

☐ Have 3M Representative call.

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COMPANY ....
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CITY .... ZONE .... STATE ....

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SUPPLIERS OF QUALITY STEEL
TO MIDDLE AMERICA FOR 75 YEARS

Granite City Steel Marks Its 75th Year with an Expansion and Modernization Program To Help Serve You Better

Recognition comes hard here in the Middle West . . . but a reputation, once built, stands fast. We are glad that in this, our 75th year, grandsons of our first puddlers are producing steels and steel products for grandsons of our original customers. To us, it shows enduring faith in business reputation built the lasting way . . . through a record of technical accomplishment and service rendered.

A comprehensive modernization and expansion program going on right now at Granite City Steel means better steel, and more of it, leaving from St. Louis up and down the Mississippi. And, as always, you can count on the same expert, experienced handling of your steel problems that our long list of customers has learned to expect.

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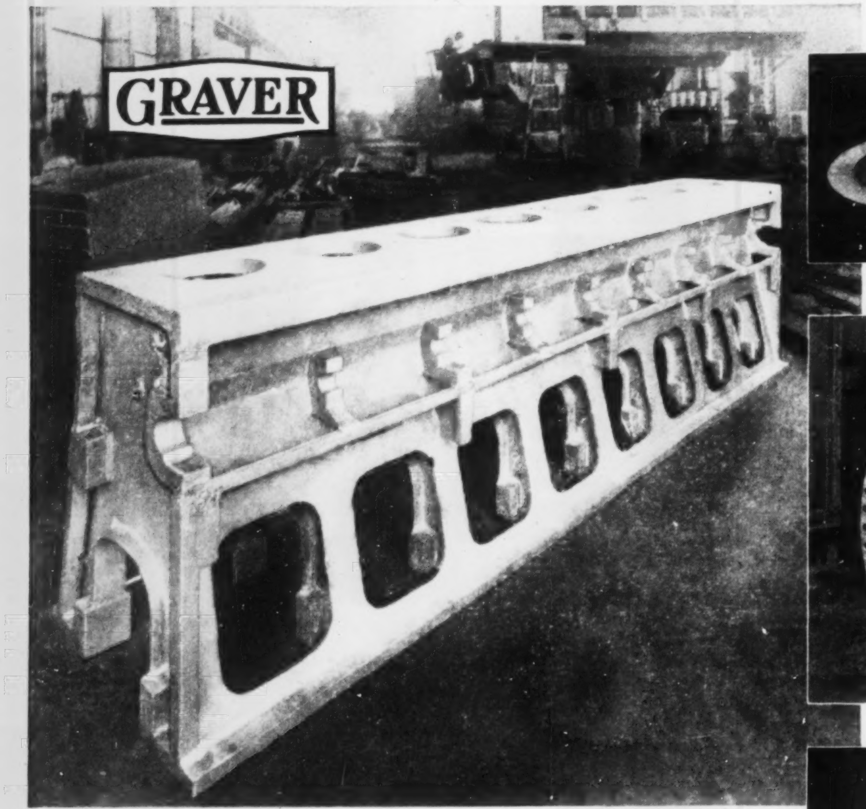
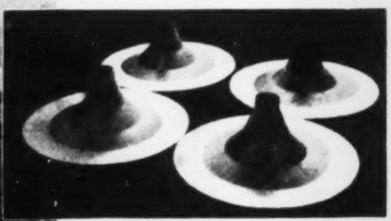
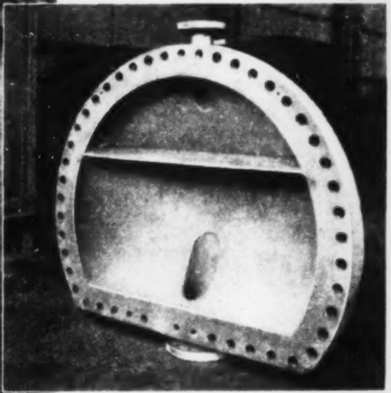


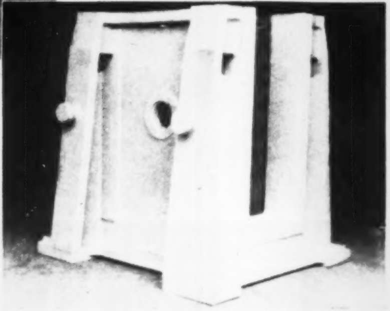
8-cylinder marine diesel engine block approx. 14′ long 12,850 lbs.



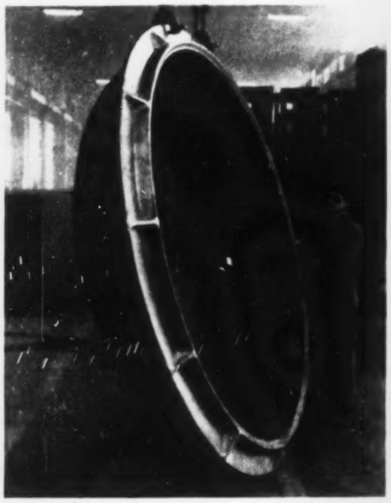
Turbine discharge deflectors
84″ O.D. 800 lbs.



Reboiler channel head approx.
7′ wide 4,500 lbs.



Pinion base approx. 6′ high
20,000 lbs.



Lead kettle approx. 11′ dia.
6,000 lbs.

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large and small . . .
simple and complex

Graver is fully equipped to produce quality weldments to any specifications. Industry's recognition of this fact is reflected in the great variety of products constantly passing through Graver's weldery.

Yet each of these weldments, regardless of size or complexity, is fabricated with exacting care and precision.

Unsurpassed craftsmanship, unusual versatility — important reasons why Graver is a leading name wherever welded fabrications are of importance.

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5
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Hundreds of heats made with MCA Ferro-Boron have shown no fading effect in properties, from first to last ingot
users of FERRO-BORON in Steel Making
find these advantages
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Having successfully developed and introduced the use of Boron in commercial steels (U. S. Patents 2,283,299 and 2,509,281), the Molybdenum Corporation is qualified by years of research and practical experience to advise the steel maker and to supply his needs for the most satisfactory production of Boron Steels. Advantages to be considered are:

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With every size in SKF's wide range of ball and roller bearings, you receive an extra quality—*team-work.* This is the ability of SKF field and home office engineers to cooperate productively with your equipment designers. Helping to solve their bearing problems is the *extra* which all industries have learned to expect from SKF.

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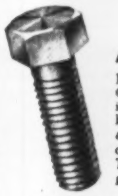

"SHINYHEADS"

America's Best Looking Cap Screw

Made of high carbon steel — AISI C-1038 — to standards for Full Finished hexagon head cap screws — bright finish. Heads machined top and bottom. Hexagon faces clean cut, smooth and true, mirror finish. Tensile strength 95,000-110,000 p.s.i. Carried in stock.

"HI-CARBS"

Heat Treated Black Satin Finish

Made of high carbon steel — AISI C-1038. Furnished with black satin finish due to double heat treatment. Hexagon heads die made, not machined. Points machine turned; flat and chamfered. Tensile strength 130,000-160,000 p.s.i. Carried in stock.

"LO-CARBS"

Made of AISI C-1018 steel—bright finish. For use where heat treatment is not required and where ordinary hexagon heads are satisfactory. Hexagon heads die made to size — not machined. Points machine turned. Tensile strength 75,000-95,000 p.s.i. Carried in stock.

SET SCREWS

Square head and headless — cup point. Case hardened. Expertly made by the pioneers in producing Cup Point Set Screws by the cold upset process. Cup points machine turned. Carried in stock.

FILLISTER CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.

FLAT HEAD CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.

"SHINYLAND" STUDS

All studs made steam-tight on tap end unless otherwise specified, with flat and chamfered machined point. Nut end, oval point. Land between threads shiny, bright, mirror finish. Carried in stock.

ADJUSTING SCREWS

Valve tappet adjusting screws — Hexagon head style — to blue print specifications—hexagon head hard; polished if specified — threads soft to close tolerance — points machine turned; flat and chamfered.

CONNECTING ROD BOLTS

Made of alloy steel — heat treated — threads rolled or cut — finished to extremely close thread and body tolerances — body ground where specified. Expertly made by the pioneers in producing connecting rod bolts by the cold upset process.

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Case hardened to proper depth and ground to close tolerances. Thread end annealed. Supplied in various head shapes, with oil holes and grooves of different kinds, and flats accurately milled.

FERRY PATENTED ACORN NUTS

For ornamental purposes. Steel insert — steel covered. Finish: plain, zinc plated, cadmium plated. Size: 9/16", 3/4", 15/16" across the flats.

Tapped 1/4" to 3/4" inclusive. Cross section of Ferry patented acorn nut, showing how steel hexagon nut fits snugly into shell.

Pioneers and Recognized Specialists, Cold Upset Screw Products since 1907

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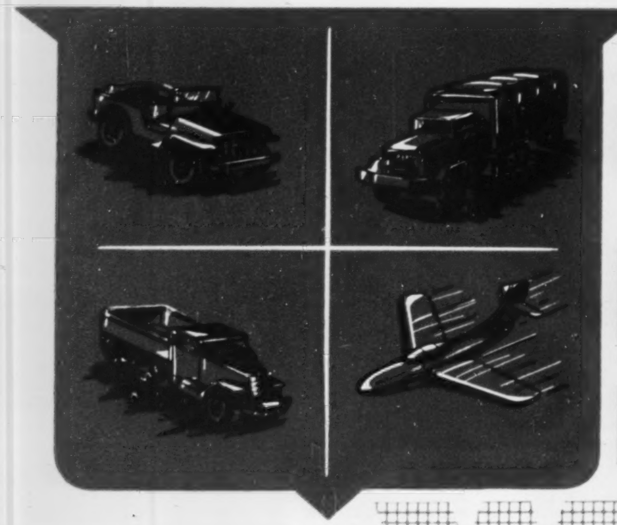
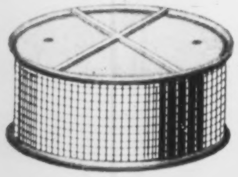


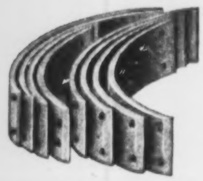
in prime defense industries

REYNOLDS WIRE

protects performance



Small parts . . . but big in performance . . . air cleaners and brake linings are typical of many, many applications for which Reynolds wire is made to meet special needs of automotive and other "precise specification" industries.



★ No part, however small can ever be of dubious dependability. Precision parts, precision performance. For defense that goes double!

Prime defense industries . . . and their suppliers, right down the line . . . *rely on Reynolds.*

Reynolds is the "precise specification" wire cloth—made to meet special needs—whatever the application. Wire diameter . . . metal or alloy . . . temper or workability . . . weight or weave . . . mesh or finish. You specify *it,* you get it. Exactly!

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WORCESTER WIRE WORKS...*Worcester, Mass.*... **Round and Shaped Steel Wire, Small Sizes**

Rear view of an actual blast furnace installation showing 4 sections of a MULTI-DUTY Air Filter—Capacity of 105,000 cfm.

it takes **CLEAN AIR** to operate a blast furnace **AT A PROFIT**

The mighty volumes of air fed to the hungry blast furnaces of the nation are dependent upon a number of mechanical factors. One of these is the rotary compressor. And, despite their appearance, these big, rugged machines are vulnerable to the billions of tiny abrasive particles found in the air. If the intake air is not thoroughly cleaned *before* it reaches the impellers — minute abrasive dust particles are intercepted by the impeller blades and their abrasive action will quickly wear the blades, resulting in "down time" for repairs.

The AAF MULTI-DUTY filter has proved the solution to this problem. These time-tested units have been performing reliable and economical service in some of the nation's biggest steel mills for years. They remove dust and dirt particles from the intake air before it reaches the impellers. Thus costly replacements and "down time" are minimized and efficiency is maintained when the MULTI-DUTY automatic air filter is on the job. To get the facts about the AAF MULTI-DUTY filter — please write for Engineering Bulletin No. 241.

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American Air Filter
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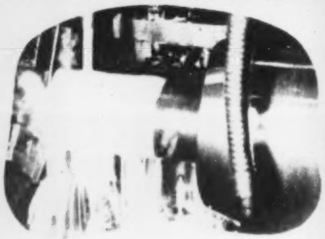
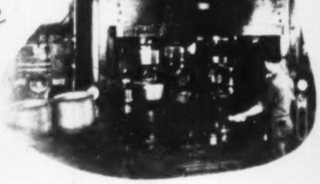
. . . they'll help you get more out of your productive capacity in 1955*

coolants and lubricants for MACHINING



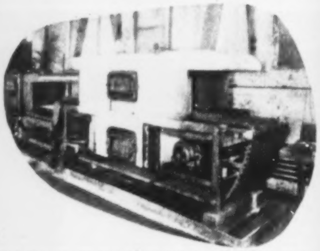
☐ Want a single water soluble cutting base that will handle 90% of all machining jobs?

drawing lubricants for FORMING



☐ Like the latest data on compounds that ease the draw and simplify today's complex forming operations?

compounds for metal CLEANING



☐ How about a "cold cleaner" that is used at room temperature . . . no heat problems, freedom from rusting, savings all along the line?

core oils for CASTING

☐ Are you looking for a surer way to choose the *right* core-oil-to-sand combination in your foundry operations?

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☐ How about a quenching oil faster in quenching speed than any oil medium yet developed for lean alloy steels?

inhibited coatings for RUST PREVENTION

☐ Or one thin-film multi-purpose rust preventive that's the answer to most of your rust prevention problems?

*Check any item on which you want full information . . . sign in the margin of this page . . . and mail to E. F. HOUGHTON & CO., 303 W. Lehigh Ave., Philadelphia 33, Pa.

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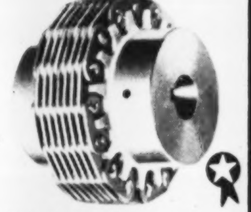
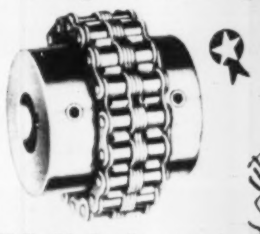
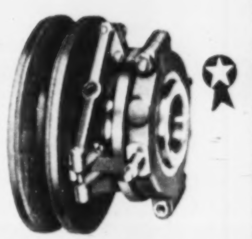


DSC Flexible Couplings, capacities from 2.70 hp at 100 rpm to 119 hp at 2000 rpm.

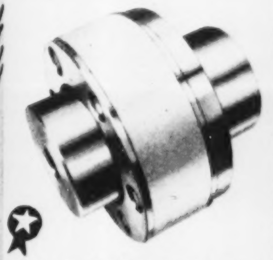


DRC Flexible Couplings, capacities from 2.70 hp at 100 rpm to 286 hp at 1800 rpm.



Morse-Rockford Over-Center Friction Clutches, hp ranges from .57 to 1.7 per 100 rpm.

Stock Silent Chains and Sprockets, capacities up to 50 hp.



Morflex Radial Couplings, capacities from 3 to 262 hp per 100 rpm.

ALSO
these
custom-ordered
products—

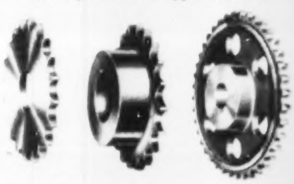
HY-VO DRIVE

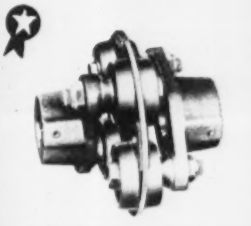
MORSE-ROCKFORD PULLMORE CLUTCHES

MORFLEX DRIVE SHAFTS

MORSE CABLE CHAIN

Stock Roller Chains from 3/8" pitch to 2" pitch; corresponding Stock Sprockets in Types A, B, C.





Morflex Flexible Couplings, capacities from .06 to 13.80 hp per 100 rpm.

MORSE

Top engineering help goes right along with these MORSE Power Transmission Products

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Morse
means
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Transmission

You'll go a long way toward getting more dependable, longer-lived power transmission when you specify *Morse*.

But perhaps you need more than just fine power transmission equipment. Perhaps you need specialized engineering help to unravel a particular problem.

Then talk things over with your Morse Distributor. He can give you plenty of help. And when there's need, he can call in a skilled, experienced Morse sales engineer. With the three of you pooling your specialized knowledge, it won't be long before you have things running as smoothly as a Morse Silent Chain.

Take advantage of the cost savings and long service life inherent in the readily available Morse equipment (above). Check with your local Morse Distributor today.

* Engineering Service, Long Service Life, Quality — which you get in unusual degree when you buy Morse Power Transmission Products

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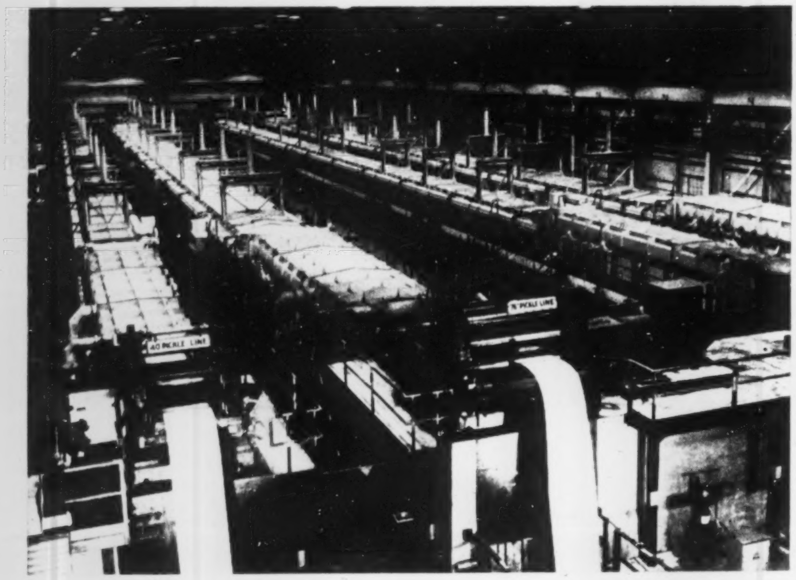
CHEMSTEEL
CONSTRUCTION COMPANY, INC.

Acid-Alkali-Proof Construction News of Interest to Metal Working Men

GARY MILL BOOSTS PRODUCTION WHILE REPLACING PICKLING LINES



Recent replacement of four pickling lines at U. S. Steel's Gary Sheet and Tin Mill increased production 33 1/3% . . . held "down time" to 15 days a line . . . and actually started to increase total production before replacement was completed.

Through unique use of temporary beam supports, Chemsteel Construction Co., Inc., started to build permanent brick piers below beams at same time J. M. Foster & Co. installed tank shells above. Chemsteel next lined installed tank with high-temperature, acid-alkali-proof, double brick (10,000 a day!); then finished piers while Foster installed mechanical equipment. Chemsteel also installed acid-alkali-proof brick flooring.

Each old line had four 60′ acid tanks, two 35′ wash tanks, and mechanical equipment. Each new line has (1) a one-piece, rubber - and - brick - lined acid tank, 285′ long; 5′ deep—including a cold-water rinse compartment, (2) a hot-water rinse tank, 35′8″ long; 3′5″ deep, and (3) Wean equipment. Two new lines are 8′ wide; two are 5′ wide. They handle 20% sulfuric acid at approximately 220° F.

RECENT CHEMSTEEL ACID-ALKALI-PROOF INSTALLATIONS

Jones & Laughlin Steel Corp.
Aliquippa Plant

Pickling Tank in Electrolytic Tinning Line, 103′ long x 7′ wide x 3′ deep; with 139′ x 13′ x 1′ Drip Tray, Supporting Piers, and 3 Acid Sumps. Rubberlined steel shell tank has 8″ acid brick lining, joined with resinous cement.

American Steel & Wire Co.
Donora, Pa., Plant

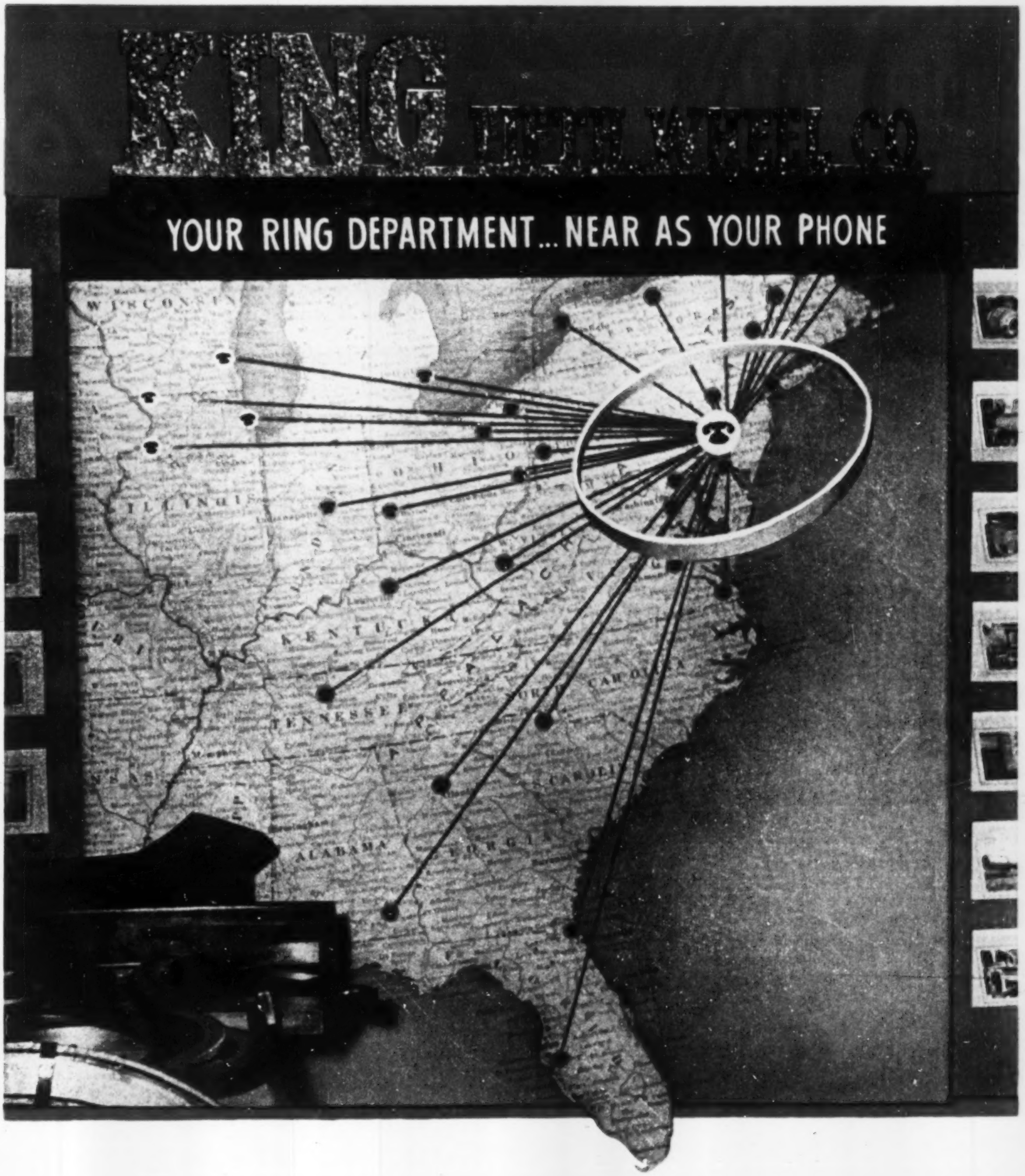
2 Acid Holding Tanks, 20′ x 20′ x 15′ and 7 Neutralizing Tanks, 15′ x 15′ x 8′ for neutralizing waste and pickle liquors by the Iron Sulphate method. Tanks are of concrete protected by a triple layer membrane and 8″ acid brick sheathing.

Greer Steel Co.
Anderson, Ind.

Pickling tank for new backup process of pickling loose wound coils of sheet and strip. Permits treating 8-10 coils at one time. Concrete tank, 50′ x 4′6″ x 6′ deep is protected by $\frac{3}{8}$″ triple-layer membrane and 8″ high-temperature acid brick sheathing.

Find out how you, too, can profit from Chemsteel specialized acid - alkali - proof construction services. Write for details today!

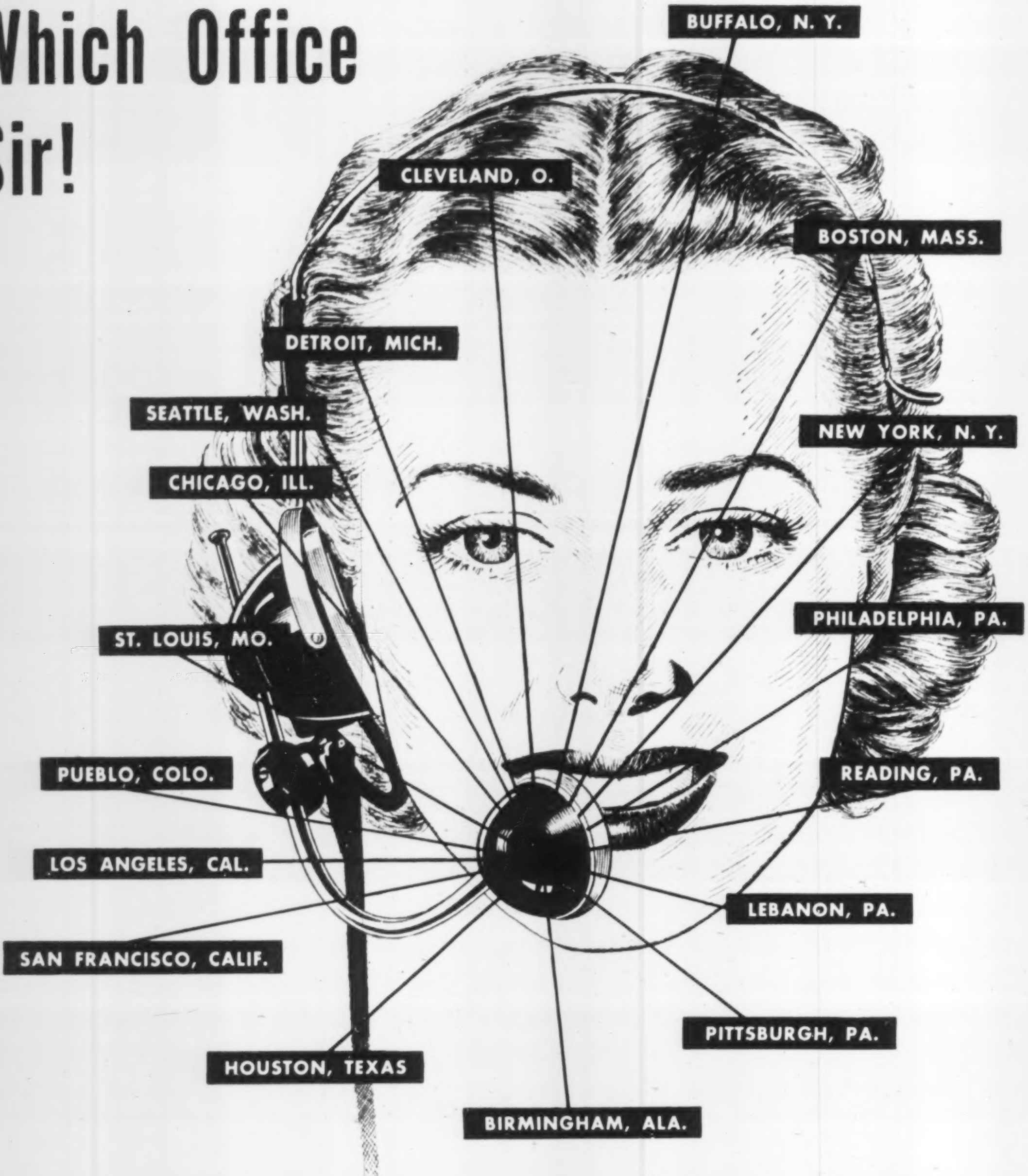
CHEMSTEEL CONSTRUCTION COMPANY, INC. 203 CHEMSTEEL BLDG., PITTSBURGH 32, PA.


KING FIFTH WHEEL CO.
YOUR RING DEPARTMENT... NEAR AS YOUR PHONE

The illustration shows part of King Fifth Wheel's display at the first "Made in Greater Philadelphia" exhibition. The theme: "Your ring department . . . near as your phone" applies to your business if you use rings which King can bend and weld. During 1953 add NEbraska 4-2444 to your list of important phone numbers and call it often!

2917 NORTH SECOND STREET • PHILADELPHIA 33, PA.

Which Office Sir!


BUFFALO, N. Y.
CLEVELAND, O.
BOSTON, MASS.
DETROIT, MICH.
SEATTLE, WASH.
NEW YORK, N. Y.
CHICAGO, ILL.
PHILADELPHIA, PA.
ST. LOUIS, MO.
PUEBLO, COLO.
READING, PA.
LOS ANGELES, CAL.
LEBANON, PA.
SAN FRANCISCO, CALIF.
PITTSBURGH, PA.
HOUSTON, TEXAS
BIRMINGHAM, ALA.

CONSULT OUR NEAREST OFFICE FOR THE PURCHASE AND SALE OF SCRAP

LURIA BROTHERS AND COMPANY, INC.

MAIN OFFICE
LINCOLN-LIBERTY BLDG.
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LEBANON, PENNA — DETROIT (ECORSE), MICHIGAN
READING, PENNA — PITTSBURGH, PENNA
MODENA, PENNA — ERIE, PENNA

OFFICES
BIRMINGHAM, ALA. — DETROIT, MICH. — PITTSBURGH, PENNA.
BOSTON, MASS. — HOUSTON, TEXAS — PUEBLO, COLORADO
BUFFALO, N. Y. — LEBANON, PENNA. — READING, PENNA.
CHICAGO, ILLINOIS — LOS ANGELES, CAL. — ST. LOUIS, MO.
CLEVELAND, OHIO — NEW YORK, N. Y. — SAN FRANCISCO, CAL.
SEATTLE, WASH.

LEADERS IN IRON AND STEEL SCRAP SINCE 1889

STEEL *January 5, 1953*

The Market Outlook

THE United States enters the new year with the largest steel ingot capacity it has ever had. It's between 116 million and 117 million net tons.

Whether that's enough or too much remains to be seen. Per person in the U. S. it's equivalent to 1465 pounds. A year ago there were 1395 pounds. Projected expansion of capacity to 120 million tons some time this year will put the capacity to approximately 1495 pounds per capita, after allowance for continuation of the present rate of growth in the population.

FIFTH IN A ROW—This is the fifth consecutive time the U. S. has entered a new year with an increased and record-breaking capacity.

Expansion of the U. S. ingot capacity to between 116 million and 117 million net tons from 108.6 million on Jan. 1, 1952, keeps this country far in the lead over the capacity of any other country. The U. S. capacity is equal to half the steel ingot tonnage produced in the world in 1952.

U. S. STAYS AHEAD—Of the 230,458,000 net tons of steel for ingots and castings produced in the world in 1952, the U. S. output of approximately 93 million tons was by far the biggest of any country, despite the two-months steelworkers' strike. A poor second was Russia, with 38 million tons. Germany, including the Soviet zone, was third with 19.7 million tons. Great Britain was fourth with 17.9 million tons, and France was fifth with 12 million.

BIGGEST INDUSTRY—Even in the face of the severity of the steelworkers' strike on the U. S. economy, there were enough steel and other metals to permit the nation's largest industry, metalworking, to push its sales to a record high for the third consecutive year. The 1952 sales approximated $111 billion, including $5 billion for undocumented ordnance production, compared with $100.3 billion in 1951 and $83.3 billion in 1950.

Rise in steelmaking costs and capacity has prompted much discussion as to how much steel production can drop off before earnings disappear. While the steelworkers' strike will be reflected in earnings for 1952, the industry's financial reports will show the industry made money. It did so at an operating rate that averaged approximately 86 per cent for the year. In a sense, that rate is misleading. It would be lower if it were computed on capacities that actually existed throughout the year. The computation is based on capacity as of Jan. 1, 1952. However, capacity rose around 7.5 million tons over the year.

BIG THREE—The new year came in with defense needs still making themselves prominent in the forms of steel they require. Large bars and heavy plates remain in terrific demand. In 1952, they were two of the three biggest products tonnagewise. The other was cold-rolled sheets.

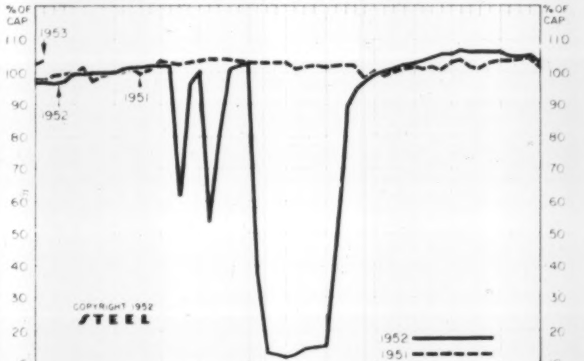
Biggest consumer of steel in 1952 continued to be the automotive industry.

FIGHTING FOR STEEL—The auto industry continues to press particularly hard for an increased share of the finished steel output. From other quarters too have come strengthened demands for steel. A noticeable surge in demand was born out of optimism stemming from the election of General Eisenhower to the presidency. Now it appears that capacity steel production is assured for the first half of 1953.

PREDOMINANTLY CIVILIAN—Unless there's an all-out war, most of the steel in 1953 will go, as it did in 1952, into uses normally regarded as civilian. Direct defense requirements for steel in 1953, including atomic energy, are not expected to exceed 14 million tons of ingots.

With relatively good business expected for 1953, outright reductions in the standard prices of steel are not in the cards. Increasing competition among steel sellers, however, could give the consumer some price advantages in the form of elimination of premium prices, improvement in qualities, and freight absorption by producers.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended Jan. 3	Change	Same Week 1952	Same Week 1951
Pittsburgh	104	2	96	97.5
Chicago	110	0.5	99.5	99.5
Mid-Atlantic	100	5	101.5	100
Youngstown	106	0	106	106
Wheeling	100.5	2.5	102	96
Cleveland	106.5	16.5*	99	101
Buffalo	104	0	104	104
Birmingham	108	4	104	100
New England	90	1	85	85
Cincinnati	93	3	102	97
St. Louis	88.5	0	58.5	87.5
Detroit	102	0	108	106
Western	108	3	102	92.5
Estimated national rate	106	3	97	98

Based on weekly steelmaking capacity of 2,077,040 tons in 1952 and 1953; 1,999,034 tons for 1951.

*Change from revised rate for preceding week.

The Metalworking Outlook p 103   Forum on Technical Progress p 205

Composite Market Averages

FINISHED STEEL PRICE INDEX: Bureau of Labor Statistics	Dec. 30 1952	Dec. 23 1952	Month Ago	December Average
(1947-1949 = 100)	130.6	130.6	130.5	130.6

AVERAGE PRICES (BUREAU OF LABOR STATISTICS)
Week Ended Dec. 30, 1952

Units are 100 lb except where otherwise noted below in parentheses. For complete description of products see insert following p. 28, STEEL, Sept. 8, 1952.

Rails	$3.775	Sheets, C.R. carbon	$5.275
Track spikes	6.650	Sheets, galv.	6.915
Track bolts	9.958	Strip, C.R. carbon	5.100
Tie plates	4.775	Strip, C.R. stainless (lb)	0.325
Joint bars	4.925	Pipe, black, buttweld (100 ft)	7.090
Plates, carbon	4.150	Pipe, galv., buttweld (100 ft)	8.887
Structural shapes	4.200	Boiler tubes (100 ft)	31.663
Bars, tool steel (lb)	1.576	Tin plate (100 lb base box)	8.950
Bars, 3120 alloy	6.575	Terne plate (100 lb base box)	7.750
Bars, stainless (lb)	0.149	Wire, carbon, merchant	6.075
Bars, carbon	4.100	Wire, fence, galv.	6.458
Bars, reinforcing	4.050	Nails (100 lb kegs)	7.410
Bars, C.F. carbon	5.925	Wire, barbed (80 rod spool)	5.920
Sheets, H.R. carbon	4.125	Woven wire fence (20 rod roll)	13.720

FINISHED PRICE INDEX, Weighted: Calculated by STEEL*	Dec. 31 1952	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av. = 100)	181.31	181.31	181.31	171.92	132.93
Index in cents per lb	4.912	4.912	4.912	4.657	3.601

ARITHMETICAL PRICE COMPOSITES: Calculated by STEEL*

Finished Steel NT	$110.98	$110.98	$110.98	$106.32	$78.05
No. 2 Fdry. Pig Iron, GT	55.04	55.04	55.04	52.24	37.03
Basic Pig Iron, GT	54.66	54.66	54.66	52.16	36.56
Malleable Pig Iron, GT	55.77	55.77	55.77	53.27	37.70
Steelmaking Scrap, GT	43.00	43.00	43.00	43.00	39.92

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composites, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS	Dec. 31 1952	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	3.95	3.95	3.95	3.70	2.90
Bars, H.R., Chicago	3.95	3.95	3.95	3.70	2.90
Bars, H.R., del. Philadelphia	4.502	4.502	4.502	4.223	3.318
Bars, C.F., Pittsburgh	4.925	4.925	4.925	4.55	3.55
Shapes, Std., Pittsburgh	3.85	3.85	3.85	3.65	2.80
Shapes, Std., Chicago	3.85	3.85	3.85	3.65	2.80
Shapes, del., Philadelphia	4.13	4.13	4.13	3.918	2.954
Plates, Pittsburgh	3.90	3.90	3.90	3.70	2.95
Plates, Chicago	3.90	3.90	3.90	3.70	2.95
Plates, Coatesville, Pa.	4.35	4.35	4.35	4.15	3.40
Plates, Sparrows Point, Md.	3.90	3.90	3.90	3.70	2.95
Plates, Claymont, Del.	4.35	4.35	4.35	4.15	3.40
Sheets, H.R., Pittsburgh	3.775	3.775	3.775	3.60-75	2.80
Sheets, H.R., Chicago	3.775	3.775	3.775	3.60	2.80
Sheets, C.R., Pittsburgh	4.575	4.575	4.575	4.35	3.55
Sheets, C.R., Chicago	4.575	4.575	4.575	4.35	3.55
Sheets, C.R., Detroit	4.775	4.775	4.775	4.55	3.70
Sheets, Galv., Pittsburgh	5.075	5.075	5.075	4.80	3.90
Strip, H.R., Pittsburgh	3.75-4.225	3.75-4.225	3.75-4.225	3.75-4.00	2.80
Strip, H.R., Chicago	3.725	3.725	3.725	3.50	2.80
Strip, C.R., Pittsburgh	5.10-5.80	5.10-5.80	5.10-5.80	4.65-5.35	3.55
Strip, C.R., Chicago	5.35	5.35	5.35	4.90	3.65
Strip, C.R., Detroit	5.30-6.05	5.30-6.05	5.30-6.05	4.85-5.60	3.70
Wire, Basic, Pittsburgh	5.10-5.225	5.10-5.225	5.10-5.225	4.85-5.10	3.675
Nails, Wire, Pittsburgh	6.20-6.35	6.20-6.35	6.20-6.35	5.90-6.20	4.625
Tin plate box, Pittsburgh	$8.95	$8.95	$8.95	$8.70	$6.70

SEMIFINISHED					
Billets, forging, Pitts. (NT)	$70.50	$70.50	$70.50	$66.00	$56.50
Wire rods, $\frac{7}{32}$-$\frac{3}{8}$", Pitts.	4.425	4.425	4.425	4.10-30	3.05

PIG IRON, Gross Ton					
Bessemer, Pitts.	$55.50	$55.50	$55.50	$53.00	$37.00
Basic Valley	54.50	54.50	54.50	52.00	36.00
Basic, del. Phila.	59.25	59.25	59.25	56.61	38.84
No. 2 Fdry, Pitts.	55.00	55.00	55.00	52.50	36.50
No. 2 Fdry, Chicago	55.00	55.00	55.00	52.50	38.00
No. 2 Fdry, Valley	55.00	55.00	55.00	52.50	36.50
No. 2 Fdry, del. Phila.	59.75	59.75	59.75	57.11	39.34
No. 2 Fdry, Birm.	51.38	51.38	51.38	48.88	34.88
No. 2 Fdry (Birm.) del. Cin.	58.93	58.93	58.93	55.49	38.74
Malleable, Valley	55.00	55.00	55.00	52.50	36.50
Malleable, Chicago	55.00	55.00	55.00	52.50	38.50
Charcoal, Lyles, Tenn.	68.50	68.50	68.50	66.00	50.00
Ferromanganese, Etna, Pa.	228.00	228.00	228.00	188.00	151.00*

*F.o.b. cars, Pittsburgh.

SCRAP, Gross Ton (including broker's commission)					
No. 1 Heavy Melt, Pitts.	$44.00	$44.00	$44.00	$44.00	$40.00
No. 1 Heavy Melt, E. Pa.	41.50	41.50	41.50	42.50	41.00
No. 1 Heavy Melt, Chicago	42.50	42.50	42.50	42.50	38.75
No. 1 Heavy Melt, Valley	44.00	44.00	44.00	44.00	39.75
No. 1 Heavy Melt, Cleve.	43.00	43.00	43.00	43.00	39.25
No. 1 Heavy Melt, Buffalo	43.00	43.00	43.00	43.00	42.50
Rails, Rerolling, Chicago	52.50	52.50	52.50	52.50	60.00
No. 1 Cast, Chicago	44.00	44.00	45.00	49.00†	63.50

† F.o.b. shipping point.

COKE, Net Ton					
Beehive, Furn., Connlsvl.	$14.75	$14.75	$14.75	$14.75	$12.00-13.00
Beehive, Fdry., Connlsvl.	17.00	17.00	17.00	17.50	14.00-15.00
Oven Fdry., Chicago	24.50	24.50	24.50	23.00	17.60

PIG IRON

F.o.b. furnace prices quoted under GCPR as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax. Key to producing companies published on second following page.

PIG IRON, Gross Ton	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa. B2	$56.50	$57.00	$57.50	$58.00
New York, del.		60.78	61.28	
Newark, del.	59.52	60.02	60.52	61.02
Philadelphia, del.	59.25	59.75	60.25	60.75
Birmingham District				
Alabama City, Ala. R2	50.88	51.38		
Birmingham R2	50.88	51.38		
Birmingham S9		51.38		
Woodward, Ala. W15	50.88	51.38		
Cincinnati, del.		58.93		
Buffalo District				
Buffalo R2	54.50	55.00	55.50	
Buffalo H1	54.50	55.00	55.50	
Tonawanda, N.Y. W12	54.50	55.00	55.50	
No. Tonawanda, N.Y. T9		55.00	55.50	
Boston, del.	65.15	65.65	66.15	
Rochester, N.Y. del.	57.52	58.02	58.52	
Syracuse, N.Y. del.	58.62	59.12	59.62	
Chicago District				
Chicago I-3	54.50	55.00	55.00	55.50
Gary, Ind. U5	54.50		55.00	
Indiana Harbor, Ind. I-2	54.50		55.00	
So. Chicago, Ill. W14	54.50	55.00	55.00	
So. Chicago, Ill. Y1	54.50	55.00	55.00	
So. Chicago, Ill. U5	54.50		55.00	55.50
Milwaukee, del.	56.67	57.17	57.17	57.67
Muskegon, Mich. del.		61.30	61.30	
Cleveland District				
Cleveland A7	54.50	55.00	55.00	55.50
Cleveland R2	54.50	55.00	55.00	
Akron, O., del. from Cleve.	57.11	57.61	57.61	58.11
Lorain, O. N3	54.50			55.50
Duluth I-3			55.00	
Erie, Pa. I-3	54.50	55.00	55.00	55.50
Everett, Mass. E1		59.25	59.75	
Fontana, Calif. K1	60.50	61.00		
Granite City, Ill. G4	56.40	56.90	57.40	
St. Louis, del. (inc. tax)	57.15	57.65	58.15	
Ironton, Utah C11	54.50	55.00		
Geneva, Utah C11	54.50	55.00		
Lone Star, Tex. L6	50.50	*51.00	51.00	
Minnequa, Colo. C10	56.50	57.50	57.50	
Rockwood, Tenn. T3			58.50	
Pittsburgh District				
Neville Island, Pa. P6		55.00	55.00	55.50
Pitts., N.&S. sides, Ambridge Aliquippa, del.		56.37	56.37	56.87
McKees Rocks, del.		56.04	56.04	56.54
Lawrenceville, Homestead, Wilmerding, Monaca, del.		56.66	56.66	57.16
Verona, Trafford, del.		57.19	57.19	57.69
Brackenridge, del.		57.45	57.45	57.95
Bessemer, Pa. U5	54.50		55.00	55.50
Clairton, Rankin, So. Duquesne, Pa. U5	54.50			
McKeesport, Pa. N3	54.50			55.50
Monessen, Pa. P7	56.50			
Sharpsville, Pa. S6			55.00	55.50
Steelton, Pa. B2	56.50	57.00	57.50	58.00
Swedeland, Pa. A3	58.50	59.00	59.50	60.00
Toledo, O. I-3	54.50	55.00	55.00	55.50
Cincinnati, del.	59.97	60.47		
Troy, N.Y. R2	56.50	57.00	57.50	58.00
Youngstown District				
Hubbard, O. Y1	54.50	55.00	55.00	
Youngstown Y1	54.50	55.00	55.00	
Youngstown U5	54.50			55.50
Mansfield, O., del.	59.15	59.65	59.65	60.15

* Low phos. southern grade.

PIG IRON DIFFERENTIAL

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.0-6.50% silicon; add $1.50 for each 0.5% Si)

Jackson, O. G2, J1	$65.50
Buffalo H1	66.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Niagara Falls, N.Y. P15	$91.00
Keokuk, Iowa, Openhearth & Fdry., frt. allowed K2	92.50
Keokuk, OH. & Fdry., 12½ lb piglets, 16% Si, frt. allowed K2	95.50
Wenatchee, Wash., OH & Fdry., frt. allowed K2	92.50

CHARCOAL PIG IRON, Gross Ton

(Low phos semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles, Tenn. T3	$68.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$59.50
Steelton, Pa. B2	62.50
Philadelphia, delivered	66.05
Troy, N.Y. R2	62.50

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Semifinished and Finished Steel Products

Mill prices quoted under GCPR as reported to STEEL, Dec. 31, 1952, cents per pound except as otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company; key on next two pages.

INGOTS, Carbon, Forging (NT)

Fontana,Calif. K1	$81.00
Munhall,Pa. U5	54.00
Seattle S24	75.00

INGOTS, Alloy (NT)

Detroit R7	$57.00
Fontana,Calif. K1	83.00
Houston S5	65.00
Midland,Pa. C18	57.00
Munhall,Pa. U5	57.00

BILLETS, BLOOMS & SLABS

Carbon, Rerolling (NT)

Bessemer,Pa. U5	$59.00
Clairton,Pa. U5	59.00
Ensley,Ala. T2	59.00
Fairfield,Ala. T2	59.00
Fontana,Calif. K1	78.00
Gary,Ind. U5	59.00
Johnstown,Pa. B2	59.00
Lackawanna,N.Y. B2	59.00
Munhall,Pa. U5	59.00
So.Chicago,Ill. U5	59.00
So.Duquesne,Pa. U5	59.00

Carbon, Forging (NT)

Bessemer,Pa. U5	$70.50
Buffalo R2	70.50
Canton,O. R2	70.50
Clairton,Pa. U5	70.50
Cleveland R2	70.50
Conshohocken,Pa. A3	77.50
Detroit R7	73.50
Ensley,Ala. T2	70.50
Fairfield,Ala. T2	70.50
Fontana,Calif. K1	89.50
Gary,Ind. U5	70.50
Geneva,Utah C11	70.50
Houston S5	78.50
Johnstown,Pa. B2	70.50
Lackawanna,N.Y. B2	70.50
LosAngeles B3	89.50
Munhall,Pa. U5	70.50
Seattle B3	89.50
So.Chicago R2,U5,W14	70.50
So.Duquesne,Pa. U5	70.50
So.SanFrancisco B3	89.50

Alloy, Forging (NT)

Bethlehem,Pa. B2	$76.00
Buffalo R2	76.00
Canton,O. R2	76.00
Canton,O. T7	78.60
Conshohocken,Pa. A3	83.00
Detroit R7	79.00
Fontana,Calif. K1	95.00
Gary,Ind. U5	76.00
Houston S5	84.00
Ind.Harbor,Ind. Y1	76.00
Johnstown,Pa. B2	76.00
Lackawanna,N.Y. B2	76.00
LosAngeles B3	96.00
Massillon,O. R2	76.00
Midland,Pa. C18	76.00
Munhall,Pa. U5	76.00
So.Chicago R2,U5,W14	76.00
So.Duquesne,Pa. U5	76.00
Struthers,O. Y1	76.00
Warren,O. C17	76.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2	$87.50
Canton,O. R2	87.50
Cleveland R2	87.50
Fontana,Calif. K1	108.50
Gary,Ind. U5	87.50
Massillon,O. R2	87.50
So.Chicago,Ill. R2	87.50
So.Duquesne,Pa. U5	87.50

SHEET BARS (NT)

Fontana,Calif. K1(43)	$89.00

SKELP

Aliquippa,Pa. J5	$3.65
Munhall,Pa. U5	3.55
Warren,O. R2	3.55
Youngstown R2, U5	3.55

WIRE RODS

Alton,Ill. L1	4.70
AlabamaCity,Ala. R2	4.325
Buffalo W12	4.325
Cleveland A7	4.325
Donora,Pa. A7	4.325
Fairfield,Ala. T2	4.325
Fontana,Calif. K1	5.125
Houston S5	4.725
Johnstown,Pa. B2	4.325
Joliet,Ill. A7	4.325
KansasCity,Mo. S5	4.665
LosAngeles B3	5.125
Minnequa,Colo. C10	4.575
Monessen,Pa. P7	4.325
No.Tonawanda,N.Y. B11	4.325
Pittsburg,Calif. C11	4.975
Portsmouth,O. P12	4.525
Roebling,N.J. R5	4.425
So.Chicago,Ill. R2	4.325
SparrowsPoint,Md. B2	4.425
Sterling,Ill.(1) N15	4.325
Struthers,O. Y1	4.325
Torrance,Calif. C11	5.125
Worcester,Mass. A7	4.625

SHEET STEEL PILING

Ind.Harbor,Ind. I-2	4.675
Lackawanna,N.Y. B2	4.675
Munhall,Pa. U5	4.675
So.Chicago,Ill. U5	4.675

STRUCTURALS

Carbon Steel Stand. Shapes

AlabamaCity,Ala. R2	3.85
Aliquippa,Pa. J5	3.85
Bessemer,Ala. T2	3.85
Bethlehem,Pa. B2	3.90
Clairton,Pa. U5	3.85
Fairfield,Ala. T2	3.85
Fontana,Calif. K1	4.45
Gary,Ind. U5	3.85
Geneva,Utah C11	3.85
Houston S5	4.25
Ind.Harbor,Ind. I-2	3.85
Johnstown,Pa. B2	3.90
KansasCity,Mo. S5	4.45
Lackawanna,N.Y. B2	3.90
LosAngeles B3	4.45
Minnequa,Colo. C10	4.30
Munhall,Pa. U5	3.85
Niles,Calif.(22) P1	4.56
Phoenixville,Pa. P4	6.10
Seattle B3	4.50
So.Chicago,Ill. U5, W14	3.85
So.SanFrancisco B3	4.40
Torrance,Calif. C11	4.45
Weirton,W.Va. W6	4.10

Wide Flange

Bethlehem,Pa. B2	3.90
Clairton,Pa. U5	3.85
Fontana,Calif. K1	4.85
Johnstown,Pa. B2	3.90
Lackawanna,N.Y. B2	3.90
Munhall,Pa. U5	3.85
So.Chicago,Ill. U5	3.85

Alloy Stand. Shapes

Clairton,Pa. U5	4.725
Fontana,Calif. K1	5.925
Gary,Ind. U5	4.725
Munhall,Pa. U5	4.725
So.Chicago,Ill. U5	4.725

H.S., L.A. Stand. Shapes

Aliquippa,Pa. J5	5.80
Bessemer,Ala. T2	5.80
Bethlehem,Pa. B2	5.80
Clairton,Pa. U5	5.80
Fairfield,Ala. T2	5.80
Fontana,Calif. K1	6.40
Gary,Ind. U5	5.80
Geneva,Utah C11	5.80
Ind.Harbor,Ind. I-2	5.80
Ind.Harbor,Ind. Y1	6.30
Johnstown,Pa. B2	5.80
Lackawanna,N.Y. B2	5.80
LosAngeles B3	6.35
Munhall,Pa. U5	5.80
Seattle B3	6.40
So.Chicago,Ill. U5	5.80
So.SanFrancisco B3	6.30
Struthers,O. Y1	6.30

H.S., L.A. Wide Flange

Aliquippa,Pa. J5	5.50
Bethlehem,Pa. B2	5.80
Lackawanna,N.Y. B2	5.80
Munhall,Pa. U5	5.75
So.Chicago,Ill. U5	5.75

BEARING PILES

Munhall,Pa. U5	3.85
So.Chicago,Ill. U5	3.85

PLATES, High-Strength Low-Alloy

Aliquippa,Pa. J5	5.95
Bessemer,Ala. T2	5.95
Clairton,Pa. U5	5.95
Cleveland J5, R2	5.95
Conshohocken,Pa. A3	6.20
Ecorse,Mich. G5	6.90
Fairfield,Ala. T2	5.95
Fontana,Calif.(30) K1	6.55
Gary,Ind. U5	5.95
Geneva,Utah C11	5.95
Ind.Harbor,Ind. I-2	5.95
Ind.Harbor,Ind. Y1	6.45
Johnstown,Pa. B2	5.95
Munhall,Pa. U5	5.95
Pittsburgh J5	5.95
Seattle B3	6.85
Sharon,Pa. S3	5.95
So.Chicago,Ill. U5	5.95
SparrowsPoint,Md. B2	5.95
Warren,O. R2	5.95
Youngstown Y1	6.45
Youngstown U5	5.95

PLATES, Open-Hearth Alloy

Claymont,Del. C22	5.35
Coatesville,Pa. L7	5.75
Conshohocken,Pa. A3	5.55
Fontana,Calif. K1	6.20
Gary,Ind. U5	5.25
Johnstown,Pa. B2	5.25
Munhall,Pa. U5	5.25
Sharon,Pa. S3	5.70
So.Chicago,Ill. U5	5.25
SparrowsPoint,Md. B2	5.25

FLOOR PLATES

Cleveland J5	4.95
Conshohocken,Pa. A3	4.95
Ind.Harbor,Ind. I-2	4.95
Munhall,Pa. U5	4.95
So.Chicago,Ill. U5	4.95

PLATES, Ingot Iron

Ashland,c.l. (15) A10	4.15
Cleveland,c.l. R2	4.50
Warren,O., c.l. R2	4.50

PLATES, Carbon Steel

AlabamaCity,Ala. R2	3.90
Aliquippa,Pa. J5	3.90
Ashland,Ky. (15) A10	3.90
Bessemer,Ala. T2	3.90
Clairton,Pa. U5	3.90
Claymont,Del. C22	4.35
Cleveland J5, R2	3.90
Coatesville,Pa. L7	4.35
Conshohocken,Pa. A3	4.35
Ecorse,Mich. G5	4.45
Fairfield,Ala. T2	3.90
Fontana,Calif.(30) K1	4.50
Gary,Ind. U5	3.90
GraniteCity,Ill. G4	4.60
Geneva,Utah C11	3.90
Harrisburg,Pa. C5	6.50
Houston S5	4.30
Ind.Harbor,Ind. I-2, Y1	3.90
Johnstown,Pa. B2	3.90
Lackawanna,N.Y. B2	3.90
Minnequa,Colo. C10	4.70
Munhall,Pa. U5	3.90
Pittsburgh J5	3.90
Seattle B3	4.80
Sharon,Pa. S3	4.15
So.Chicago,Ill. U5, W14	3.90
SparrowsPoint,Md. B2	3.90
Steubenville,O. W10	3.90
Warren,O. R2	3.90
Weirton,W.Va. W6	4.20
Youngstown R2, U5, Y1	3.90

PLATES, Carbon A.R.

Fontana,Calif. K1	5.65
Geneva,Utah C11	5.05

PLATES, Wrought Iron

(Add 4.7% to base and extras)

Economy,Pa. B14	8.60

BARS, Hot-Rolled Carbon

AlabamaCity,Ala. R2	3.95
Aliquippa,Pa. J5	3.95
Alton,Ill. L1	4.50
Atlanta,Ga. A11	4.50
Bessemer,Ala. T2	3.95
Buffalo R2	3.95
Canton,O. R2	3.95
Clairton,Pa. U5	3.95
Cleveland R2	3.95
Detroit R7	4.10
Ecorse,Mich. G5	4.30
Emeryville,Calif. J7	4.70
Fairfield,Ala. T2	3.95
Fontana,Calif. K1	4.65
Gary,Ind. U5	3.95
Houston S5	4.35
Ind.Harbor,Ind. I-2, Y1	3.95
Johnstown,Pa. B2	3.95
KansasCity,Mo. S5	4.55
Lackawanna,N.Y. B2	3.95
LosAngeles B3	4.65
Milton,Pa. B6	4.55
Minnequa,Colo. C10	4.40
Niles,Calif. P1	4.65
N.Tonawanda,N.Y. B11	3.95
Pittsburg,Calif. C11	4.65
Pittsburgh J5	3.95
Seattle B3, N14	4.70
So.Chicago R2,U5,W14	3.95
So.Duquesne,Pa. U5	3.95
So.SanFran.,Cal. B3	4.70
Sterling,Ill. N15	4.55
Struthers,O. Y1	3.95
Torrance,Calif. C11	4.65
Weirton,W.Va. W6	4.10
Youngstown R2, U5	3.95

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5	3.95
Atlanta A11	4.50
Niles,Calif. P1	4.65
SanFrancisco S7	5.00

BAR SIZE ANGLES; H.R. CARBON

Bethlehem,Pa. B2	4.15

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2	4.675
Buffalo R2	4.675
Canton,O. R2	4.675
Canton,O. T7	4.72
Clairton,Pa. U5	4.675
Detroit R7	4.825
Ecorse,Mich. G5	5.025
Fontana,Calif. K1	5.725
Gary,Ind. U5	4.675
Houston S5	5.075
Ind.Harbor,Ind. I-2, Y1	4.675
Johnstown,Pa. B2	4.675
KansasCity,Mo. S5	5.275
Lackawanna,N.Y. B2	4.675
LosAngeles B3	5.725
Massillon,O. R2	4.675
Midland,Pa. C18	4.675
So.Chicago R2,U5,W14	4.675
So.Duquesne,Pa. U5	4.675
Struthers,O. Y1	4.675
Warren,O. C17	4.675
Youngstown U5	4.675

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5	4.925
Gary,Ind. U5	4.925
Youngstown U5	4.925

BARS & SMALL SHAPES, H. R., High-Strength Low-Alloy

Aliquippa,Pa. J5	5.925
Bessemer,Ala. T2	5.925
Bethlehem,Pa. B2	5.925
Clairton,Pa. U5	5.925
Cleveland R2	5.925
Ecorse,Mich. G5	6.675
Fairfield,Ala. T2	5.925
Fontana,Calif. K1	6.925
Gary,Ind. U5	5.925
Ind.Harbor,Ind. I-2	5.925
IndianaHarbor,Ind. Y1	6.425
Johnstown,Pa. B2	5.925
Lackawanna,N.Y. B2	5.925
LosAngeles B3	6.625
Pittsburgh J5	5.925
Seattle B3	6.675
So.Duquesne,Pa. U5	5.925
So.SanFrancisco B3	6.675
Struthers,O. Y1	6.425
Youngstown U5	5.925

BARS, Cold-Finished Carbon

Ambridge,Pa. W18	4.925
BeaverFalls,Pa. R2	4.925
BeaverFalls,Pa. M12	4.925
Buffalo B5	4.975
Camden,N.J. P13	5.375
Carnegie,Pa. C12	4.925
Chicago B5	4.925
Chicago W18	4.925
Cleveland A7, C20	4.925
Detroit P17, R7	5.075
Donora,Pa. A7	4.925
Elyria,O. W8	4.925
FranklinPark,Ill. N5	4.925
Gary,Ind. R2	4.925
GreenBay,Wis. F7	4.925
Hammond,Ind. L2, M13	4.925
Hartford,Conn. R2	5.475
LosAngeles R2	6.375
Mansfield,Mass. B5	5.475
Massillon,O. R2, R8	4.925
Monaca,Pa. S17	4.925
Newark,N.J. W18	5.375
Plymouth,Mich. P5	5.175
Pittsburgh J5	4.925
Putnam,Conn. W18	5.475
Readville,Mass. C14	5.475
St.Louis,Mo. M5	5.30
So.Chicago,Ill. W14	4.925
SpringCity,Pa. K3	5.375
Struthers,O. Y1	4.925
Waukegan,Ill. A7	4.925
Youngstown Y1	4.925
Youngstown F3	4.925

BARS, Cold-Finished Alloy

Ambridge,Pa. W18	6.00
BeaverFalls,Pa. M12	6.00
Bethlehem,Pa. B2	6.00
Buffalo B5	6.00
Camden,N.J. P13	6.40
Canton,O. R2	6.00
Canton,O. T7	5.99
Carnegie,Pa. C12	6.00
Chicago B5	6.00
Chicago W18	6.00
Cleveland A7	6.05
Cleveland C20	6.00
Detroit P17, R7	6.15
Donora,Pa. A7	6.05
Elyria,O. W8	6.00
Gary,Ind. R2	6.00
Hammond,Ind. L2, M13	6.00
Hartford,Conn. R2	6.45
Lackawanna,N.Y. B2	6.00
Mansfield,Mass. B5	6.45
Massillon,O. R2, R8	6.00
Midland,Pa. C18	6.00
Monaca,Pa. S17	6.00
Newark,N.J. W18	6.35
Plymouth,Mich. P5	6.20
So.Chicago,Ill. R2, W14	6.00
SpringCity,Pa. K3	6.20
Struthers,O. Y1	6.00
Warren,O. C17	6.00
Waukegan,Ill. A7	6.05
Worcester,Mass. A7	6.35
Youngstown Y1	6.00
Youngstown F3	6.00

BARS, Reinforcing (Fabricators)

AlabamaCity,Ala. R2	3.95
Atlanta A11	4.50
Buffalo R2	3.95
Cleveland R2	3.95
Emeryville,Calif. J7	4.70
Fairfield,Ala. T2	3.95
Fontana,Calif. K1	4.65
Gary,Ind. U5	3.95
Houston S5	4.35
Ind.Harbor,Ind. I-2, Y1	3.95
Johnstown,Pa. B2	3.95
KansasCity,Mo. S5	4.55
Lackawanna,N.Y. B2	3.95
LosAngeles B3	4.65
Milton,Pa. B6	4.55
Minnequa,Colo. C10	4.75
Niles,Calif. P1	4.65
Pittsburg,Calif. C11	4.65
Pittsburgh J5	3.95
SandSprings,Okla. S5	4.85
Seattle B3, N14	4.70
So.Chicago,Ill. R2	3.95
So.Duquesne,Pa. U5	3.95
So.SanFrancisco B3	4.70
SparrowsPoint,Md. B2	3.95
Sterling,Ill.(1) N15	4.70
Struthers,O. Y1	3.95
Torrance,Calif. C11	4.65
Youngstown R2, U5	3.95

BARS, Reinforcing (Fabricated; to consumers)

Huntington,W.Va. W7	5.50
Johnstown, ¼-1" B2	5.25
LosAngeles B3	5.45
Marion,O. P11	5.25
Seattle B3, N14	5.80
So.SanFrancisco B3	5.45
SparrowsPt. ¼-1" B2	5.25
Williamsport,Pa. S19	5.35

RAIL STEEL BARS

ChicagoHts.(3,4) C2	5.00
ChicagoHts.(3,4) I-2	4.75
Franklin,Pa.(3,4) F5	5.00
FortWorth,Tex.(26) T4	5.10
Huntngt.,W.Va.(3) W7	5.75
Marion,O.(3) P11	4.75
Moline,Ill.(3) R2	4.95
Tonawanda(3,4) B12	5.00
Williamsport(3) S19	5.25
Williamsport(4) S19	5.35

BARS, Wrought Iron

(Add 4.7% to base and extras)

Economy,Pa.(S.R.) B14	9.60
Economy,Pa.(D.R.)B14	11.90
Economy(Staybolt)B14	12.20
McK.Rks.(Staybolt)L5	14.50
McK.Rks.(S.R.) L5	9.60
McK.Rks.(D.R.) L5	13.00

SHEETS, Hot-Rolled Steel

(18 gage and heavier)

AlabamaCity,Ala. R2	3.775
Ashland,Ky.(8) A10	3.775
Butler,Pa. A10	3.775
Cleveland J5, R2	3.775
Conshohocken,Pa. A3	4.175
Detroit M1	4.40
Ecorse,Mich. G5	3.975
Fairfield,Ala. T2	3.775
Fontana,Calif. K1	4.725
Gary,Ind. U5	3.775
Geneva,Utah C11	3.875
GraniteCity,Ill. G4	4.30
Ind.Harbor,Ind. I-2, Y1	3.775
Irvin,Pa. U5	3.775
Lackawanna,N.Y. B2	3.775
Munhall,Pa. U5	3.775
Niles,O. N12	5.425
Pittsburg,Calif. C11	4.475
Pittsburgh J5	3.775
Sharon,Pa. S3	4.175
So.Chicago,Ill. W14	3.775
SparrowsPoint,Md. B2	3.775
Steubenville,O. W10	3.775
Torrance,Calif. C11	4.475
Warren,O. R2	3.775
Weirton,W.Va. W6	3.775
WestLeechburg,Pa. A4	3.925
Youngstown U5, Y1	3.775

SHEETS, H.R. (19 gage)

AlabamaCity,Ala. R2	4.925
Dover,O. R1	5.825
Mansfield,O. E6	5.65
Niles,O. N12	5.675
Torrance,Calif. C11	5.575

SHEETS, H.R. (14 ga. heavier) High-Strength Low-Alloy

Cleveland J5, R2	5.675
Conshohocken,Pa. A3	5.925
Ecorse,Mich. G5	6.225
Fairfield,Ala. T2	5.675
Fontana,Calif. K1	6.625
Gary,Ind. U5	5.675
Ind.Harbor,Ind. I-2	5.675
Ind.Harbor,Ind. Y1	6.175
Irvin,Pa. U5	5.675
Lackawanna(35) B2	5.675
Munhall U5	5.675
Pittsburgh J5	5.675
Sharon,Pa. S3	5.675
So.Chicago,Ill. U5	5.675
SparrowsPoint(36) B2	5.675
Warren,O. R2	5.675
Weirton,W.Va. W6	6.025
Youngstown U5	5.675
Youngstown Y1	6.175

SHEETS, Cold-Rolled High-Strength Low-Alloy

Cleveland J5, R2	6.925
Ecorse,Mich. G5	7.475
Fontana,Calif. K1	7.875
Gary,Ind. U5	6.925
IndianaHarbor,Ind. Y1	7.425
IndianaHarbor,Ind. I-2	6.925
Irvin,Pa. U5	6.925
Lackawanna(37) B2	6.925
Pittsburgh J5	6.925
SparrowsPoint(38) B2	6.925
Warren,O. R2	6.925
Weirton,W.Va. W6	7.275
Youngstown Y1	7.425

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.575
Cleveland J5, R2	4.575
Ecorse,Mich. G5	4.775
Fairfield,Ala. T2	4.575
Follansbee,W.Va. F4	5.575
Fontana,Calif. K1	5.525
Gary,Ind. U5	4.575
GraniteCity,Ill. G4	5.275
Ind.Harbor,Ind. I-2,Y1	4.575
Irvin,Pa. U5	4.575
Lackawanna,N.Y. B2	4.575
Middletown,O. A10	4.575
Pittsburg,Calif. C11	5.525
Pittsburgh J5	4.575
SparrowsPoint,Md. B2	4.575
Steubenville,O. W10	4.575
Warren,O. R2	4.575
Weirton,W.Va. W6	5.775
WestLeechburg,Pa. A4	5.45
Youngstown Y1	4.575

SHEETS, Galv'd No. 10 Steel

AlabamaCity,Ala. R2	5.075
Ashland,Ky.(8) A10	5.075
Canton,O. R2	5.075
Delphos,O. N16	5.675
Dover,O. R1	5.775
Fairfield,Ala. T2	5.075
Gary,Ind. U5	5.075
GraniteCity, Ill. G4	5.50
Ind.Harbor,Ind. I-2	5.075
Irvin,Pa. U5	5.075
Kokomo,Ind.(13) C16	5.475
MartinsFerry,O. W10	5.075
Niles,O. N12	6.275
Pittsburg,Calif. C11	5.825
SparrowsPoint,Md. B2	5.075
Steubenville,O. W10	5.075
Torrance,Calif. C11	5.825
Weirton,W.Va. W6	5.075

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. U5	7.625
SparrowsPoint(39) B2	7.775

SHEETS, Galvannealed Steel

Canton,O. R2	5.625
Irvin,Pa. U5	5.625
Kokomo,Ind.(13) C16	6.025
Niles,O. N12	6.825

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	5.325
Middletown,O. A10	5.325

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.925
Niles,O. R2 (28)	5.925
Weirton,W.Va. W6	5.775

SHEETS, Well Casing

Fontana,Calif. K1 (13)	5.10
Torrance,Calif. C11	5.275

BLUED Stock, 29 ga

Yorkville,O. W10	7.00
Follansbee,W.Va. F4	7.10
Follansbee (23) F4	6.425

SHEETS, Enameling Iron

Ashland,Ky.(8) A10	4.925
Cleveland R2	4.925
Gary,Ind. U5	4.925
GraniteCity,Ill. G4	5.625
Ind.Harbor,Ind. I-2	4.925
Irvin,Pa. U5	4.925
Middletown,O. A10	4.925
Youngstown Y1	4.925

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$6.25
Fairfield,Ala. T2	6.60
Gary,Ind. U5	6.50
GraniteCity,Ill. G4	6.70
Ind.Harbor,Ind. I-2, Y1	6.50
Irvin,Pa. U5	6.50
Niles,O. R2	6.50
Pittsburg,Calif. C11	7.25
SparrowsPoint,Md. B2	6.60
Warren,O. R2	6.50
Weirton,W.Va. W6	6.50
Yorkville,O. W10	6.50

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4	6.10
Gary,Ind. U5	6.10
GraniteCity,Ill. G4	6.30
Ind.Harbor,Ind. Y1	6.10
Irvin,Pa. U5	6.10
Yorkville,O. W10	6.35

SHEETS, Culvert No. 16

	Cu Alloy	Cu Fe
Ashland,Ky. A10	5.875	
Canton,O. R2	5.925	6.375
Fairfield,Ala. T2	5.875	6.125
Gary,Ind. U5	5.875	6.125
Ind.Harbor I-2	5.875	6.125
Irvin,Pa. U5	5.875	6.125
Kokomo,Ind. C16	6.525	
MartinsFy.,O.W10	5.875	
Pittsburg,Cal.C11	6.625	
SparrowsPt. B2	5.875	
Torrance,Cal.C11	6.625	

SHEETS, Culvert, No. 16 Pure Iron

Ashland,Ky. A10	6.125
Fairfield,Ala. T2	6.125
MartinsFerry,O. W10	6.125

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	4.025
Cleveland R2	4.375
Ind.Harbor,Ind. I-2	4.025
Warren,O. R2	4.375

SHEETS, Cold-Rolled Ingot Iron

Butler,Pa. A10	5.075
Cleveland R2	5.175
Middletown,O. A10	5.075
Warren,O. R2	5.175

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10	5.325
Canton,O. R2	5.825

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	5.575
Middletown,O. A10	5.575

SHEETS, ALUMINIZED

Butler,Pa. A10	8.425

TIN PLATE, American Coke (Base Box)

	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.70	$8.95
Fairfield,Ala. T2	8.80	9.05
Gary,Ind. U5	8.70	8.95
Ind.Har. I-2, Y1	8.70	8.95
Irvin,Pa. U5	8.70	8.95
Pitts.,Cal. C11	9.45	9.70
Sp.Pt.,Md. B2	8.80	9.05
Warren,O. R2	8.70	
Weirton,W.Va W6	8.70	8.95
Yorkville,O. W10	8.70	8.95

TIN PLATE, Electrolytic (Base Plate

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.40	$7.65	$8.05
Fairfield,Ala. T2	7.50	7.75	8.15
Gary,Ind. U5	7.40	7.65	8.05
GraniteCity,Ill. G4	7.60	7.85	8.25
IndianaHarbor,Ind. I-2 Y1	7.40	7.65	8.05
Irvin,Pa. U5	7.40	7.65	8.05
Niles,O. R2	7.40		
Pittsburg,Calif. C11	8.15	8.40	8.80
SparrowsPoint,Md. B2	7.50	7.75	8.15
Weirton,W.Va. W6	7.40	7.65	8.05
Yorkville,O. W10	7.40	7.65	8.05

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (Cut lengths ½c lower)

	Field	Armature	Electric	Motor	Dynamo
BeechBottom W10 (cut lengths)	....		7.85	9.10	9.90
Brackenridge,Pa. A4			8.35	9.60	10.40
GraniteCity,Ill. G4 (cut lengths)			8.55	9.80	
IndianaHarbor,Ind. I-2	7.55	7.85	(34)	(41)	
Mansfield,O. E6 (cut lengths)	7.20	7.35	7.85	9.10	9.90
Niles,O. N12 (cut lengths)	7.05	7.35	7.85		
Vandergrift,Pa. U5		7.85	8.35	9.60	10.40
Warren,O. R2	7.55	7.85	8.35	9.60	10.40
Zanesville,O. A10		7.85	8.35	9.60	10.40

SHEETS, SILICON (22 Ga. Base) COILS (Cut Length ½c lower)

Transformer Grade	72	65	58	52
BeechBottom W10 (cut lengths)	10.45	11.00	11.70	12.50
Brackenridge,Pa. A4	10.95			
Vandergrift,Pa. U5	10.95	11.50	12.20	13.00
Warren,O. R2	10.95			
Zanesville,O. A10	10.95	11.50	12.20	13.00

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)

	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)	....	....	15.35	15.85
Vandergrift,Pa. U5	13.50	14.35	15.35	15.85

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$7.85
Gary,Ind. U5	7.75
Irvin,Pa. U5	7.75
Yorkville,O. W10	7.75

SHEETS, LT. Coated Ternes, 6 lb

Yorkville,O. W10	$8.65

SHEETS, Mfg. Ternes, 8 lb (Commercial Quality)

Gary,Ind. U5	$9.75
Yorkville,O. W10	9.75

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va.,W10	5.475
Gary,Ind. U5	5.475
Mansfield,O. E6	6.05
Middletown,O. A10	5.475
Niles,O. N12	6.275
Weirton,W.Va. W6	5.475

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.875

ROOFING SHORT TERNES (8 lb. Coated)

Gary,Ind. U5	9.75

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2	5.65
Conshohocken,Pa. A3	5.90
Ecorse,Mich. G5	6.30
Fairfield,Ala. T2	5.65
Fontana,Calif. K1	6.55
Gary,Ind. U5	5.65
Ind.Harb.,Ind. I-2	5.65
Ind.Harbor,Ind. Y1	6.15
Lackawanna,N.Y. B2	5.70
LosAngeles(25) B3	6.40
Seattle(25) B3	6.65
Sharon,Pa. S3	5.65
So.SanFrancisco(25) B3	6.40
SparrowsPoint,Md. B2	5.70
Warren,O. R2	5.65
Weirton,W.Va. W6	6.10
Youngstown Y1	6.15
Youngstown U5	5.65

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland J5	7.45
Cleveland A7	7.30
Dover,O. G6	8.00
Ecorse,Mich. G5	8.15
Lackawanna,N.Y. B2	7.90
Sharon,Pa. S3	7.30
SparrowsPoint,Md. B2	7.90
Warren,O. R2	7.30
Weirton,W.Va. W6	7.95
Youngstown Y1	7.80

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	3.725
Alton,Ill. L1	4.20
Ashland,Ky.(8) A10	3.725
Atlanta A11	4.275
Bessemer,Ala. T2	3.725
Bridgeport,Con.(10)S15	4.225
Buffalo(27) R2	3.725
Butler,Pa. A10	3.725
Carnegie,Pa. S18	4.225
Conshohocken,Pa. A3	4.125
Detroit M1	4.40
Ecorse,Mich. G5	4.025
Fairfield,Ala. T2	3.725
Fontana,Calif. K1	4.975
Gary,Ind. U5	3.725
Houston,Tex. S5	4.125
Ind.Harbor,Ind. I-2 Y1	3.725
Johnstown,Pa.(25) B2	3.725
KansasCity,Mo.(9) S5	4.325
Lackawanna,N.Y.(32) B2	3.725
LosAngeles(25) B3	4.475
Milton,Pa. B6	4.35
Minnequa,Colo. C10	4.775
NewBritain(10) S15	4.225
N.Tonawanda,N.Y. B11	3.725
Pittsburg,Calif. C11	4.475
Riverdale,Ill. A7	3.725
SanFrancisco S7	5.00
Seattle(25) B3	4.725
Seattle N14	4.75
Sharon,Pa. S3	4.225
So.Chicago,Ill. W14	3.725
So.SanFrancisco(25) B3	4.475
SparrowsPoint,Md. B2	3.725
Sterling,Ill. N15	4.725
Torrance,Calif. C11	4.475
Warren,O. R2	3.725
Weirton,W.Va. W6	3.825
WestLeechburg,Pa. A4	3.975
Youngstown U5, Y1	3.725

STRIP, Hot-Rolled Alloy

Bridgeprt,Conn.(10) S15	6.05
Carnegie,Pa. S18	6.45
Fontana,Calif. K1	7.30
Gary,Ind. U5	6.10
Houston,Tex. S5	6.50
KansasCity,Mo. S5	6.70
Midland,Pa. C18	5.85
NewBritn,Conn.(10) S15	6.05
Sharon,Pa. S3	6.45
Youngstown U5	6.10

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	5.50
Bridgeprt,Conn.(10) S15	5.80
Butler,Pa. A10	5.10
Cleveland A7, J5	5.10
Dearborn,Mich. D3	6.05
Detroit D2	5.60
Detroit M1	5.45
Dover,O.(40) G6	5.50
Ecorse,Mich. G5	5.30
Follansbee,W.Va. F4	5.10
Fontana,Calif. K1	6.75
FranklinPark,Ill.(40)T6	5.35
Ind.Harbor,Ind. I-2	5.35
Lackawanna,N.Y. B2	5.10
LosAngeles C1	6.85
Mattapan,Mass. T6	5.95
Middletown,O. A10	5.10
NewBritain(10) S15	5.80
NewCastle,Pa. B4	5.80
NewCastle,Pa.(40) E5	5.70
NewHaven,Conn. D2	5.85
NewHaven,Conn. A7	5.60
Pawtucket,R.I. R3	6.45
Pawtucket,R.I.(21) N8	6.30
Riverdale,Ill.(40) A1	5.35
Rome,N.Y. R6	5.10
Sharon,Pa. S3	5.80
SparrowsPoint,Md. B2	5.10
Trenton,N.J. R5	6.45
Wallingford,Conn. W2	6.30
Warren,O.(40) T5	5.70
Warren,O. R2	5.10
Weirton,W.Va. W6	5.10
Youngstown C8 (40)	5.70
Youngstown Y1	5.10

STRIP, Electro Galvanized

Dover,O. G6	5.50
Warren,O. T5	5.70
Weirton,W.Va. W6	5.10
Youngstown C8	5.70

STRIP, Cold-Rolled Alloy Steel

Bridgepr,Conn.(10)S15	12.15
Carnegie,Pa. S18	12.00
Cleveland A7	11.40
Dover,O. G6	11.90
Fontana,Calif. K1	13.05
Harrison,N.J. C18	12.00
Midland,Pa. C18	12.00
NewBritn,Conn.(10)S15	12.15
Pawtucket,R.I.(11) N8	12.15
Pawtucket,R.I.(12) N8	12.45
Sharon,Pa. S3	12.00
Worcester,Mass. A7	11.70
Youngstown C8	12.00

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	3.975
Warren,O. R2	4.325

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	5.70

TIGHT COOPERAGE HOOP

Atlanta A11	4.45
Riverdale,Ill. A1	4.30
Sharon,Pa. S3	4.55
Youngstown U5	4.15

STRIP, Cold-Finished, Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.C5C	1.C6-1.35C
Berea,O. C7		7.65	8.25	10.20	12.50
Bridgeport,Conn.(10) S15	5.80	7.65	8.25	10.20	12.50
Bristol,Conn. W1		....	8.55	10.50	....
Carnegie,Pa. S18		7.65	8.25	10.20	12.50
Cleveland A7	5.10	7.30	8.25	10.20	12.50
Dearborn,Mich. D3	6.05	7.90	8.50	....	....
Detroit D2	6.15	7.50	8.10	....	....
Dover,O. G6	5.70	7.65	8.25	10.20	12.50
FranklinPark,Ill. T6	5.45	7.45	8.40	10.35	12.65
Harrison,N.J. C18		....	8.55	10.50	12.80
Mattapan,Mass. T6	5.95	7.60	8.55	10.50	12.80
NewBritn.,Conn.(10) S15	5.80	7.65	8.25	10.20	12.50
NewCastle,Pa. B4	5.80	7.65	8.25	10.20	....
NewCastle,Pa. E5	5.80	7.65	8.25	10.20	12.50
NewHaven,Conn. D2	6.70	7.60	8.20	....	....
NewYork W3		7.95	8.55	10.50	12.80
Pawtucket,R.I. N8:					
Cleve.orPitts Base		7.65	8.25	10.20	12.50
Worcester,Mass. Base	6.30	7.95	8.55	10.50	12.80
Sharon,Pa. S3	5.80	7.65	8.25	10.20	12.50
Trenton,N.J. R5		7.95	8.55	10.50	12.80
Wallingford,Conn. W2	6.30	7.60	8.20	10.15	12.65
Warren,O. T5	6.20	7.65	8.25	10.20	12.50
Weirton,W.Va. W6	5.80	7.65	8.25	10.20	12.50
Worcester,Mass. A7	5.40	7.60	8.55	10.50	12.80
Worcester,Mass. T6	5.95	7.60	8.55	10.50	12.80
Youngstown C8		7.65	8.25	10.20	12.50
Spring Steel (Tempered)					
Trenton,N.J. R5 (29)		....	10.30	12.50	15.35
Harrison,N.J. C18		....	10.30	12.50	15.35
NewYork W3		....	10.30	12.50	15.35*
Youngstown C8		....	10.30	12.50	15.35

* Plus $1.575 per 100 lb.

Key to Producers

A1	Acme Steel Co.
A3	Alan Wood Steel Co.
A4	Allegheny Ludlum Steel
A7	American Steel & Wire
A8	Anchor Drawn Steel Co.
A9	Angell Nail & Chaplet
A10	Armco Steel Corp.
A11	Atlantic Steel Co.
A13	American Cladmetals Co.
B1	Babcock & Wilcox Co.
B2	Bethlehem Steel Co.
B3	Beth. Pac. Coast Steel
B4	Blair Strip Steel Co.
B5	Bliss & Laughlin Inc.
B6	Boiardi Steel Corp.
B8	Braeburn Alloy Steel
B11	Buffalo Bolt Co.
B12	Buffalo Steel Div. H. K. Porter Co.
B14	A. M. Byers Co.
C1	Calstrip Steel Corp.
C2	Calumet Steel Div. Borg-Warner Corp.
C4	Carpenter Steel Co.
C5	Central Iron & Steel Div. Barium Steel Corp.
C7	Cleve. Cold Rolling Mills
C8	Cold Metal Products Co.
C9	Colonial Steel Co.
C10	Colorado Fuel & Iron
C11	Columbia-Geneva Steel
C12	Columbia Steel & Shaft
C13	Columbia Tool Steel Co.
C14	Compressed Steel Shaft
C16	Continental Steel Corp.
C17	Copperweld Steel Co.
C18	Crucible Steel Co.
C19	Cumberland Steel Co.
C20	Cuyahoga Steel & Wire
C22	Claymont Steel Corp.
D2	Detroit Steel Corp.
D3	Detroit Tube & Steel
D4	Disston & Sons, Henry
D6	Driver Harris Co.
D7	Dickson Weatherproof Nail Co.
E1	Eastern Gas&Fuel Assoc.
E2	Eastern Stainless Steel
E4	Electro Metallurgical Co.
E5	Elliott Bros. Steel Co.
E6	Empire Steel Corp.
F2	Firth Sterling Inc.
F3	Fitzsimons Steel Co.
F4	Follansbee Steel Corp.
F5	Franklin Steel Div. Borg-Warner Corp.
F6	Fretz-Moon Tube Co.
F7	Ft. Howard Steel & Wire
G2	Globe Iron Co.
G3	Globe Steel Tubes Co.
G4	Granite City Steel Co.
G5	Great Lakes Steel Corp.
G6	Greer Steel Co.
H1	Hanna Furnace Corp.
I-1	Igoe Bros. Inc.
I-2	Inland Steel Co.
I-3	Interlake Iron Corp.
I-4	Ingersoll Steel Div. Borg-Warner Corp.
I-7	Indiana Steel & Wire Co.
J1	Jackson Iron & Steel Co.
J3	Jessop Steel Co.
J4	Johnson Steel & Wire Co.
J5	Jones & Laughlin Steel
J6	Joslyn Mfg. & Supply
J7	Judson Steel Corp.
J8	Jersey Shore Steel Co.
K1	Kaiser Steel Corp.
K2	Keokuk Electro Metals
K3	Keystone Drawn Steel
K4	Keystone Steel & Wire
L1	Laclede Steel Co.
L2	LaSalle Steel Co.
L3	Latrobe Steel Co.
L5	Lockhart Iron & Steel
L6	Lone Star Steel Co.
L7	Lukens Steel Co.

WIRE, Merchant Quality (6 to 8 gage)	An ld.	Galv.
AlabamaCity R2	6.075-6.325	
Aliquippa J5	6.075	6.525‡
Atlanta A11	6.325	6.675
Bartonville(19)K4	6.075	6.40
Buffalo W12	5.225	....
Cleveland A7	6.075	6.225
CrawfordsvilleM8	6.175	6.50
Donora,Pa. A7	6.075	6.225
Duluth Minn. A7	6.075	6.225
Fairfield T2	6.075	6.225
Houston,Tex. S5	6.475	6.625
Johnstown B2	6.075	6.45†
Joliet,Ill. A7	6.075	6.225
KansasC'y Mo. S5	6.675	6.825
Kokomo C16	6.175	6.425
LosAngeles B3	7.025	....
Minnequa C10	6.325	6.70*
Monessen P7	6.075	6.45
Palmer W12	5.525	....
Pitts.,Calif. C11	7.025	7.175
Prtsmth.(18)P12	6.475	....
Rankin A7	6.075	6.225
So.Chicago R2	6.075	6.325
So.S.Fran. C10	7.025	7.40*
SparrowsPt. B2	6.175	6.55†
Sterling,Ill.(1)N15	6.075	6.40
Struthers,O. Y1	6.075	6.475
Torrance,Cal. C11	7.025	....
Worcester A7	6.375	6.525

*Based on 14c zinc; †14.50c zinc; ‡17.5c zinc.

WIRE (16 gage) (Add 4.7% on base and extras)	Anl'd. Stone	Galv. Stone
Aliquippa J5	10.15	12.15
Bartonville(19)K4	10.25	12.00*
Cleveland A7	10.25	11.55
Crawfrdsville M8	10.73	12.51
Fostoria,O. S1	10.40	13.00
Johnstown B2	10.73	12.58§
Kokomo C16	10.625†	12.325§
Minnequa C10	10.40	12.425*
Palmer,Mass.W12	10.25	12.15
Pitts.,Cal. C11	10.60	11.90
SparrowsPt. B2	10.84	12.68§
Waukegan A7	10.25	11.55
Worcester A7		11.85

*Based on 14c zinc; §14.50c zinc. †Includes 4.7% increase.

WIRE, Manufacturers Bright, Low Carbon	
AlabamaCity,Ala. R2	5.225
Aliquippa,Pa. J5 (42)	4.85
Atlanta A11	5.475
Alton,Ill. L1	5.45
Bartonville,Ill. K4	5.325
Buffalo W12	5.225
Chicago W13	5.475
Cleveland A7, C20	5.225
Crawfordsville,Ind. M8	5.325
Donora,Pa. A7	5.225
Duluth,Minn. A7	5.225
Fairfield,Ala. T2	5.225
Fostoria,O. (24) S1	5.725
Houston S5	5.625
Johnstown,Pa. B2	5.225
Joliet,Ill. A7	5.225
KansasCity,Mo. S5	5.825
Kokomo,Ind. C16	5.325
LosAngeles B3	6.175
Minnequa,Colo. C10	5.475
Monessen Pa. P7	5.475
Newark 6-8 ga I-1	5.88
No.Tonawanda B11	5.225
Palmer,Mass. W12	5.525
Pittsburg,Calif. C11	6.175
Portsmouth,O. P12	5.625
Rankin,Pa. A7	5.225
So.Chicago,Ill. R2	5.225
So.SanFrancisco C10	6.175
SparrowsPoint,Md. B2	5.325
Sterling,Ill.(1) N15	5.225
Struthers,O. Y1	5.225
Torrance,Calif. C11	6.175
Waukegan,Ill. A7	5.225
Worcester,Mass. A7	5.525

WIRE, Cold-Rolled Flat	
Anderson,Ind. G6	6.20
Buffalo W12 (43)	6.35
Cleveland A7 (43)	5.85
Crawf'sville,Ind. M8(43)	5.85
Dover,O. G6	6.20
Fostoria,O. S1 (43)	6.00
Kokomo,Ind. C16 (43)	5.70
FranklinPark,Ill. T6(43)	6.20
Massillon,O. R8 (43)	5.85
Monessen,Pa. P16 (43)	6.35
Monessen,Pa. P7 (43)	6.10
Pawtkt,R.I.(12) N8 (43)	6.85
Trenton,N.J. R5 (43)	6.15
Worcester,Mass. A7 (43)	6.15
Worcester,Mass. T6 (43)	6.50
Worcester,Mass.W12(43)	6.65

WIRE, Galv'd ACSR for Cores	
Bartonville,Ill. K4	8.90
Monessen,Pa. P16 (43)	8.50
Muncie,Ind. I-7 (43)	8.70
Roebling,N.J. R5 (43)	8.80
SparrowsPt.,Md. B2(43)	8.60
Johnstown,Pa. B2 (43)	8.50

ROPE WIRE	
Alton,Ill. L1	9.15
Bartonville,Ill. K4	8.95
Buffalo W12 (43)	8.55
Fostoria,O. S1 (43)	8.85
Johnstown,Pa. B2 (43)	8.55
Monessen,Pa. P16 (43)	8.55
Monessen,Pa. P7 (43)	8.80
Muncie,Ind. I-7 (43)	8.75
Palmer,Mass. W12 (43)	8.85
Portsmouth,O. P12 (43)	8.55
Roebling,N.J. R5 (43)	8.85
SparrowsPt. B2 (43)	8.65
Struthers,O. Y1 (43)	8.55
Worcester J4 T6 (43)	8.85

(A) Plow and Mild Plow; add 0.25c for improved plow.

WIRE, MB Spring, High Carbon	
Aliquippa,Pa. J5 (43)	6.25
Alton,Ill. L1	6.85
Bartonville,Ill. K4	6.64
Buffalo W12 (43)	6.25
Cleveland A7 (43)	6.25
Donora,Pa. A7 (43)	6.25
Duluth,Minn. A7 (43)	6.25
Fostoria,O. S1 (43)	6.25
Johnstown,Pa. B2 (43)	6.25
Millbury(12) N6 (43)	8.05
Minnequa,Colo. C10 (43)	6.50
Monessen,Pa. P7 (43)	6.25
Monessen,Pa. P16	6.75
Muncie,Ind. I-7 (43)	6.45
Palmer,Mass. W12 (43)	6.55
Pittsburg,Calif. C11(43)	7.20
Roebling,N.J. R5 (43)	6.55
Portsmouth,O. P12(43)	6.25
So.Chicago,Ill. R2 (43)	6.25
So.SanFran. C10 (43)	7.20
SparrowsPt.,Md. B2 (43)	6.35
Struthers,O. Y1 (43)	6.25
Trenton,N.J. A7 (43)	6.55
Waukegan,Ill. A7 (43)	6.25
Worcester A7, T6 (43)	6.55
Worcester,Mass. W12(43)	6.55
Worcester,Mass. J4 (43)	6.75

WIRE, Upholstery Spring	
Aliquippa,Pa. J5	6.275
Alton,Ill. L1	6.50
Buffalo W12	6.275
Cleveland A7	6.275
Donora,Pa. A7	6.275
Duluth,Minn. A7	6.275
Johnstown,Pa. B2	6.275
LosAngeles B3	7.225
Minnequa,Colo. C10	6.525
Monessen,Pa. P7	6.275
Monessen,Pa. P16(42)	6.40
NewHaven,Conn. A7	6.575
Palmer,Mass. W12	6.575
Pittsburg,Calif. C11	7.225
Portsmouth,O. P12	6.275
Roebling,N.J. R5	6.575
So.Chicago,Ill. R2	6.275
So.SanFrancisco C10	7.225
SparrowsPoint,Md. B2	6.375
Torrance,Calif. C11	7.225
Trenton,N.J. A7	6.575
Waukegan,Ill. A7	6.275
Worcester,Mass. A7	6.575

WIRE, Fine & Weaving (8" Coils)	
Bartonville,Ill. K4	9.42
Buffalo W12 (43)	8.90
Chicago W13	9.32
Cleveland A7 (43)	8.90
Crawf'sville,Ind. M8(43)	8.90
Fostoria,O. S1 (43)	8.90
Johnstown,Pa. B2 (43)	8.90
Kokomo,Ind. C16 (43)	8.90
Monessen,Pa. P16 (43)	8.90
Muncie,Ind. I-7 (43)	9.10
Palmer,Mass. W12 (43)	9.20
Roebling,N.J. R5 (43)	9.20
Waukegan,Ill. A7 (43)	8.90
Worestr,Mass. A7,T6(43)	9.20

WIRE, Tire Bead	
Bartonville,Ill. K4	11.51
Monessen,Pa. P16 (43)	11.40
Roebling,N.J. R5 (43)	11.55

WOVEN FENCE, 9-15½ Ga.	Col.
AlabamaCity,Ala. R2	135
Ala.City,Ala. 17-18ga.R2	222
Aliqu'pa,Pa.9-14½ga.J5	139†
Atlanta A11	140
Bartonville,Ill.(19) K4	137
Crawfordsville,Ind. M8	139
Donora,Pa. A7	133
Duluth,Minn. A7	133
Fairfield,Ala. T2	133
Houston,Tex. S5	141
Johnstown,Pa. B2	138
Johnstown,17ga.,6" B2	229
Joliet,Ill. A7	133
KansasCity,Mo. S5	145
Kokomo,Ind. C16	140
Minnequa,Colo. C10	146*
Monessen,Pa. P7	138
Pittsburg,Calif. C11	156
Rankin,Pa. A7	133
So.Chicago,Ill. R2	135
Sterling,Ill.(1) N15	137

*Based on 14c zinc; †17.5c zinc.

FENCE POSTS	Col.
ChicagoHts.,Ill. C2	145
Duluth,Minn. A7	133
Franklin,Pa. F5	145
Huntington,W.Va. W7	148
Johnstown,Pa. B2	148
Marion,O. P11	140
Minnequa,Colo. C10	138
Moline,Ill. R2	136
So.Chicago,Ill. R2	140
Tonawanda,N.Y. B12	148
Williamsport,Pa. S19	158

WIRE, Barbed	Col.
AlabamaCity,Ala. R2	144
Aliquippa,Pa. J5	148†
Atlanta A11	149
Bartonville,Ill.(19) K4	146
Crawfordsville,Ind. M8	148
Donora,Pa. A7	142
Duluth,Minn. A7	142
Fairfield,Ala. T2	142
Houston,Tex. S5	150
Johnstown,Pa. B2	147
Joliet,Ill. A7	142
KansasCity,Mo. S5	154
Kokomo,Ind. C16	149
Minnequa,Colo. C10	153*
Monessen,Pa. P7	147
Pittsburg,Calif. C11	162
Rankin,Pa. A7	142
So.Chicago,Ill. R2	144
So.SanFran., Calif. C10	167*
SparrowsPoint,Md. B2	149
Sterling,Ill.(1) N15	146

*Based on 14c zinc; †17.5c zinc.

BALE TIES, Single Loop	Col.
AlabamaCity,Ala. R2	132
Atlanta A11	135
Bartonville,Ill.(19) K4	132
Crawfordsville,Ind. M8	134
Donora,Pa. A7	132
Duluth,Minn. A7	132
Fairfield,Ala. T2	132
Joliet,Ill. A7	132
KansasCity,Mo. S5	144
Kokomo,Ind. C16	134
Minnequa,Colo. C10	137
Pittsburg,Calif. C11	156
So.Chicago,Ill. R2	132
So.SanFran.,Calif. C10	156
SparrowsPoint,Md. B2	134
Sterling,Ill.(1) N15	132

TRACK BOLTS (20) Treated	
KansasCity,Mo. S5	9.85
Lebanon,Pa. (31) B2	9.85
Minnequa,Colo. C10	9.85
Pittsburgh O3, P14	9.85

AXLES	
Ind.Harbor,Ind. S13	5.65
Johnstown,Pa. B2	5.65

NAILS, Stock To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	127
Aliquippa,Pa. J5	127
Atlanta A11	130
Bartonville,Ill.(19) K4	127
Chicago,Ill. W13	127
Cleveland A9 (44)	125
Crawfordsville,Ind. M8	130
Donora,Pa. A7	127
Duluth,Minn. A7	127
Fairfield,Ala. T2	127
Galveston,Tex. D7	135
Houston,Tex. S5 (44)	126
Johnstown,Pa. B2	127
Joliet,Ill. A7	127
KansasCity, Mo. S5 (44)	130
Kokomo,Ind. C16	129
Minnequa,Colo. C10 (44)	123
Monessen,Pa. P7	127
Pittsburg,Calif. C11	146
Portsmouth,O. P12	132
Rankin,Pa. A7	127
So.Chicago,Ill. R2	127
SparrowsPt.,Md. B2	129
Sterling,Ill.(1) N15	127
Torrance,Calif. C11	147
Worcester,Mass. A7	133

STAPLES, Polished, Stock To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	126
Aliquippa,Pa. J5	126
Atlanta A11	129
Bartonville,Ill. (19) K4	126
Chicago W13	127
Crawfordsville,Ind. M8	128
Donora,Pa. A7	126
Duluth,Minn. A7	126
Fairfield,Ala. T2	126
Johnstown,Pa. B2	126
Joliet,Ill. A7	126
Kokomo,Ind. C16	128
Minnequa,Colo. C10 (45)	123
Monessen,Pa. P7	127
Pittsburg,Calif. C11	145
Portsmouth,O. P12	132
Rankin,Pa. A7	126
So.Chicago,Ill. R2	126
SparrowsPt.,Md. B2	128
Sterling,Ill.(1) N15	126
Torrance,Calif. C11	146
Worcester,Mass. A7	132

NAILS, Cut (100 lb keg) To dealers (33)	
Conshohocken,Pa. A3	$7.80
Wheeling,W.Va. W10	7.80

TIE PLATES	
Fairfield,Ala. T2	4.775
Gary,Ind. U5	4.775
Ind.Harbor,Ind. I-2	4.775
Lackawanna,N.Y. B2	4.775
Minnequa,Colo. C10	$95.50*
Pittsburg,Calif. C11	4.925
Seattle B3	4.925
Steelton,Pa. B2	4.775
Torrance,Calif. C11	4.925

*Per net ton.

JOINT BARS	
Bessemer,Pa. U5	4.925
Fairfield,Ala. T2	4.925
Ind.Harbor,Ind. I-2	4.925
Joliet,Ill. U5	4.925
Lackawanna,N.Y. B2	4.925
Minnequa,Colo. C10	4.925
Steelton,Pa. B2	4.925

STANDARD TRACK SPIKES	
Ind.Harbor,Ind. I-2, Y1	6.65
KansasCity,Mo. S5	6.90
Lebanon,Pa. B2	6.65
Minnequa,Colo. C10	6.65
Pittsburgh J5	6.65
Seattle B3	7.15
So.Chicago,Ill. R2	6.65
Struthers,O. Y1	6.65
Youngstown R2	6.65

RAILS	Std. No. 1	Std. No. 2	Std. All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	3.775	3.675	3.725	4.25
Ensley,Ala. T2	3.775	3.675		4.25
Fairfield,Ala. T2	....			4.25
Gary,Ind. U5	3.775	3.675	3.725	...
Huntington,W.Va. W7				5.25
IndianaHarbor,Ind. I-2	3.775	3.675	3.725	...
Johnstown,Pa. B2				(16)4.25
Lackawanna,N.Y. B2	3.775	3.675		4.25
Minnequa,Colo. C10	$75.50	$73.50*		4.75
Steelton,Pa. B2	3.775	3.675		
Williamsport,Pa. S19	....			5.00

*Per net ton.

TOOL STEEL

(Prices subject to 4.7% increase)

Grade	$ per lb
Regular Carbon	0.230
Extra Carbon	0.270
Special Carbon	0.325
Oil Hardening	0.350
5% Cr Hot Work	0.350
Hi-Carbon-Cr	0.635

Grade by Analysis

W	Cr	V	Co	
18	4	1	...	1.505
18	4	2		1.65-1.66
20.25	4.25	1.6	12.25	3.535-3.675
19	4	2	7	2.460
18.25	4.25	1	4.75	2.125
18	4	2	9	2.415-2.45
13.5	4	3	...	1.6025
9	3.25	0.5	...	1.01
W	**Cr**	**V**	**Mo**	
6.4	4.5	1.9	5	0.96-0.965
6	4	3	6	1.190
1.5	4	1	8.5	0.810

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

Key to Producers

M1	McLouth Steel Corp.	P13	Precision Drawn Steel	T2	Tenn. Coal & Iron Div.
M4	Mahoning Valley Steel	P14	Pitts. Screw & Bolt Co.	T3	Tenn. Prod. & Chem.
M5	Medart Co.	P15	Pittsburgh Metallurgical	T4	Texas Steel Co.
M6	Mercer Tube & Mfg. Co.	P16	Page Steel & Wire Div., Amer. Chain & Cable	T5	Thomas Strip Division, Pittsburgh Steel Co.
M8	Mid-States Steel & Wire	P17	Plymouth Steel Co.	T6	Thompson Wire Co.
M12	Moltrup Steel Products	R1	Reeves Steel & Mfg. Co.	T7	Timken Roller Bearing
M13	Monarch Steel Co.	R2	Republic Steel Corp.	T9	Tonawanda Iron Div., Am. Rad. & Stan. San.
N2	National Supply Co.	R3	Rhode Island Steel Corp.	U4	Universal Cyclops Steel
N3	National Tube Div.	R5	Roebling's Sons, John A.	U5	United States Steel Co.
N5	Nelsen Steel & Wire Co.	R6	Rome Strip Steel Co.	V2	Vanadium-Alloys Steel
N6	NewEng-HighCarb.Wire	R7	Rotary Electric Steel Co.	V3	Vulcan Crucible Steel Co.
N8	Newman-Crosby Steel	R8	RelianceDiv.,EatonMfg.	W1	Wallace Barnes Co.
N12	Niles Rolling Mill Div.	S1	Seneca Wire & Mfg. Co.	W2	Wallingford Steel Co.
N14	Nrthwst. Steel Roll. Mills	S3	Shafon Steel Corp.	W3	Washburn Wire Co.
N15	Northwestern S.&W. Co.	S5	Sheffield Steel Corp.	W4	Washington Steel Corp.
N16	New Delphos Mfg. Co.	S6	Shenango Furnace Co.	W6	Weirton Steel Co.
O3	Oliver Iron & Steel Corp.	S7	Simmons Co.	W7	W. Va. Steel & Mfg. Co.
O4	Oregon Steel Mills	S8	Simonds Saw & Steel Co.	W8	West.Auto.Mach.Screw
P1	Pacific States Steel Corp.	S9	Sloss-Sheffield S.&I. Div.	W9	Wheatland Tube Co.
P2	Pacific Tube Co.	S13	Standard Forgings Corp.	W10	Wheeling Steel Corp.
P4	Phoenix Iron & Steel Co.	S14	Standard Tube Co.	W12	Wickwire Spencer Steel Div., Colo. Fuel & Iron
P5	Pilgrim Drawn Steel	S15	Stanley Works	W13	Wilson Steel & Wire Co.
P6	Pittsburgh Coke & Chem.	S16	Struthers Iron & Steel	W14	Wisconsin Steel Div., International Harvester
P7	Pittsburgh Steel Co.	S17	Superior Drawn Steel Co.	W15	Woodward Iron Co.
P9	Pittsburgh Tube Co.	S18	Superior Steel Corp.	W18	Wyckoff Steel Co.
P11	Pollak Steel Co.	S19	Sweet's Steel Co.	Y1	Youngstown Sheet & Tube
P12	Portsmouth Division, Detroit Steel Corp.	S20	Southern States Steel		
		S24	Seidelhuber Steel		

Footnotes

(1) Chicago base
(2) Angles, flats, bands
(3) Merchant
(4) Reinforcing
(6) Chicago or Birm. base
(7) To jobbers, 3 cols. lower
(8) 16 gage and heavier
(9) 6 in. and narrower
(10) Pittsburgh base
(11) Cleveland & Pitts. base
(12) Worcester, Mass. base
(13) Add 0.50c for 17 Ga. & heavier
(15) ½" and thinner.
(16) 40 lb and under
(17) Flats only.
(18) To dealers
(19) Chicago & Pitts. base.
(20) 0.25c off for untreated
(21) New Haven, Conn., base
(22) Del. San Francisco Bay area
(23) 20 Ga.; 36" wide
(24) Deduct 0.20c; finer than 15 Ga.
(25) Bar mill bands
(26) Reinforcing, mill lengths, to fabricators; to consumers, 5.85c
(27) Bar mill sizes
(28) Bonderized
(29) Add $1.50 per ton
(30) Sheared; add 0.25c for universal mill
(31) Not annealed
(32) Rd. or square edge
(33) To jobbers, deduct 20c.
(34) 7.85c for cut lengths
(35) 72" and narrower
(36) 54" and narrower
(37) 15 gage & lighter; 60" & narrower
(38) 14 gage & lighter; 48" & narrower
(39) 48" and narrower
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher
(41) 9.10c for cut lengths
(42) Plus 0.25c per 100 lb
(43) Plus 4.7% on base and extras
(44) Plus 15c per 100 lb.
(45) Plus 10c per 100 lb.

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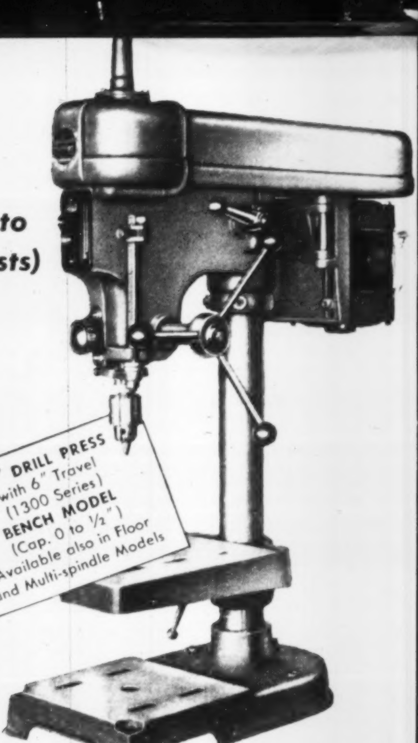

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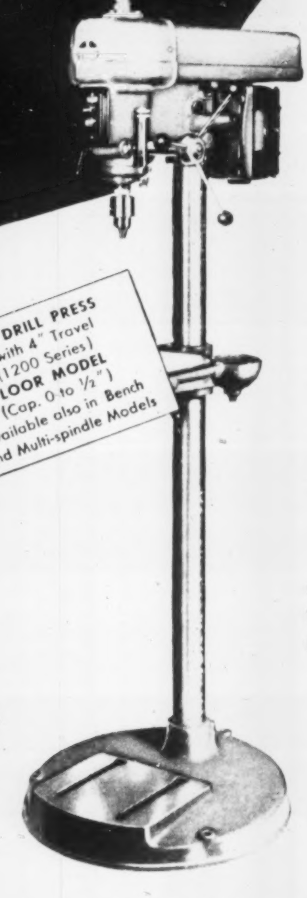
BENCH MODEL
(Cap. 0 to ½")
Available also in Floor and Multi-spindle Models



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BUTTWELD STANDARD PIPE, T & C

Carload discounts from list, %

Size—Inches	½		¾		1		1¼		1½		2		2½		3	
List Per Ft	8.5c		11.5c		17c		23c		27.5c		37c		58.5c		76.5c	
Pounds Per Ft	0.85		1.13		1.68		2.28		2.73		3.68		5.82		7.62	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	32.5	15.25	35.5	18.25	38	20.75	38.5	20.5	39	21	39.5	21.5	40	21.25	40	21.25
Alton, Ill. L1	29.5	10.5	32.5	14.5	35	18	35.5	18.5	36	19.5	36.5	20	37	20.5	37	20.5
Benwood, W. Va. W10	32.5	13.25	35.5	17.25	38	20.75	38.5	20.5	39	21.5	39.5	22	40	21.75	40	21.75
Etna, Pa. N2 (†)	32.5	13.25	35.5	17.25	38	20.75	38.5	20.5	39	22.25	39.5	22	40	21.75	40	21.75
Fontana, Calif. K1 (‡)	21	1.75	21	5.75	26.5	9.25	27	9	27.5	10	28	10.5	28.5	10.25	28.5	10.25
Ind. Harbor, Ind. Y1 (‡)	31.5	14.25	34.5	18.25	37	21.75	37.5	21	38	22	38.5	22.25	39	21.75	39	21.75
Lorain, O. N3 (*)	32.5	22.25	35.5	26.25	38	29.75	38.5	27.25	39	28.25	39.5	28.75	40	26.25	40	26.25
Sharon, Pa. M6	32.5	14.25	35.5	18.25	38	21.25	38.5	20.50	39	21.00	39.5	21.50	40	20.75	40	20.75
Sparrows Pt., Md. B2	30.5	11.25	33.5	15.25	36	18.75	36.5	18.5	37	19.5	37.5	20	38	19.75	38	19.75
Youngstown R2 (‡)	32.5	15.25	35.5	19.25	38	22.75	38.5	22.00	39	23.00	39.5	23.50	40	22.75	40	22.75
Youngstown Y1 (‡)	32.5	15.25	35.5	19.25	38	22.75	38.5	22.00	39	23.00	39.5	23.50	40	22.75	40	22.75
Wheatland, Pa. W9	32.5	13.25	35.5	16.25	38	18.75	38.5	19	39	19.5	39.5	20	40	20.25	40	20.25

SEAMLESS STANDARD PIPE, T & C

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	24	6	27	8.25	27	8.25	29	10.25	29	10.25	33.75	15	33.75	15
Ambridge, Pa. N2	24	6	27	8.25	27	8.25	29	10.25	29	10.25	33.75	15	33.75	15
Lorain, O. N3 (*)	24	12.75	27	12.75	27	12.75	29	14.75	20	14.75	33.75	19.5	33.75	19.5
Youngstown Y1 (‡)	24	7.50	27	9.25	27	9.25	29	11.25	29	11.25	33.75	16	33.75	16

ELECTRIC WELD STANDARD PIPE, T & C

	2		2½		3		3½		4		5		6	
Youngstown, R2 (‡)	24	7.50	27	9.25	27	9.25	29	11.25	29	11.25	33.75	16	33.75	16

BUTTWELD STANDARD PIPE, T & C

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		3½		4	
List Per Ft	5.5c		6c		6c		92c		$1.09	
Pounds Per Ft	0.24		0.42		0.57		9.20		10.89	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Benwood, W. Va. W10	29.5	+0.25	23.25	+3.5	17.75	+7.75	33	14.25	33	14.25
Butler, Pa. F6 (‡)	30.5	1.25	25	+1.75	20	+5.5				
Etna, Pa. N2 (†)	30.5	1.25	25	+1.75	20	+5.5	33	14.25	33	14.25
Sharon, Pa. M6 (§)	29.5	+0.25	23	+4.25	18	+8.25	...	...	...	...
Sparrows Pt., Md. B2	28.5	+0.75	23	+3.75	18	7.50	...	...	...	...
Youngstown R2 (‡)	...	...	...	...	...	...	33	15.25	33	15.25
Wheatland, Pa. W9	28.5	+0.75	23	+3.75	18	7.50	...	...	...	...

Galvanized pipe discounts based on zinc price of: (‡), 14c; (†), 12.50c; (§), 14.50c; (*), 5c, with discounts adjusted depending on price of zinc at time of shipment.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft., mill, minimum wall thickness, cut lengths 10 to 24 ft., inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	14.19	16.71–17.77	16.20	16.20
1¼	13	16.97	19.80–21.26	16.46	19.19
1½	13	18.22–18.77	22.08–22.82	18.19	21.41
1¾	13	20.35–21.35	24.92–25.49	20.69	24.35
2	13	22.81–23.93	27.94–28.58	23.19	27.28
2¼	13	25.69–26.66	31.38–32.18	25.84	30.42
2¼	12	28.40–29.36	34.55–35.58	28.46	33.50
2½	12	31.28–32.17	37.83–39.19	31.19	36.67
2¾	12	33.87–34.82	40.09–42.44	33.05	38.86
3	12	35.78–36.87	42.11–44.93	34.98	40.82

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:	
½-in. & smaller diam.	15
½-in. & ⅝-in.	18.5
¾-in. and larger	17.5
Longer than 6 in.:	
All diams.	14
Lag bolts, all diams.:	
6 in. and shorter	23
over 6 in. long	21
Ribbed Necked Carriage	18.5
Blank	34
Plow	34
Step, Elevator, Tap and Sleigh Shoe	21
Tire Bolts	21
Boiler & Fitting-Up Bolts	31

NUTS

H.P. & C.P.	Reg.	Hvy.
Square:		
½-in. & smaller	15	15
½-in. & ⅝-in.	12	6.5
¾-in.-1½-in.	9	1
1⅝-in. & larger	7.5	1
H.P. Hex.:		
½-in. & smaller	26	22
½-in. & ⅝-in.	16.5	6.5
¾-in.-1½-in.	12	2
1⅝-in. & larger	8.5	2
C.P. Hex.:		
½-in. & smaller	26	22
½-in. & ⅝-in.	23	17.5
¾-in. & 1½-in.	19.5	12
1⅝-in. & larger	12	6.5

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)

	Reg.	Hvy.
½-in. & smaller	35	28.5
½-in. & ⅝-in.	29.5	22
¾-in.-1½-in.	24	15
1⅝-in. & larger	13	8.5
		Light
7/16-in. & smaller		35
½-in. to ⅝-in.		28.5
¾-in. to 1½-in.		26

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam x 6 in. and shorter	38
1 in. and smaller diam. x over 6 in.	26

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	35
¼-in. diam. & larger	16
N.F. thread, all diams.	10

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages)

Plain finish	48 & 10
Plated finishes	31 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:	
⅝-in. & smaller	42
¾-in. through 1 in.	34
Longer than 6 in.:	
⅝-in. and smaller	26
¾-in. through 1 in.	4

RIVETS

F.o.b. midwestern plants

Structural ½-in., larger	7.85c
7/16-in. under	36 off

ELECTRODES

(Threaded, with nipples, unboxed f.o.b. plant)

GRAPHITE

Inches Diam.	Length	Cents per lb
17,18,20	60,72	17.85
8 to 16	48,60,72	17.85
7	48,60	19.57
6	48,60	20.95

CARBON

Diam.	Length	Cents per lb
35,40	110	8.03
30	65,84,110	8.03
24	72 to 104	8.03
17 to 20	34,90	8.03

METALLURGICAL COKE

Price net ton

BEEHIVE OVENS

Connellsvll.fur	$14.50-15.00
Connellsvil.fdy	16.50-17.50
New River foundry	20.80
Wise county, foundry	15.95
Wise county, furnace	15.20

OVEN FOUNDRY COKE

Kearney, N. J. ovens	$24.00
Everett, Mass., ovens New England del.	*26.05
Chicago ovens	24.50
Chicago, del.	26.00
Terre Haute, ovens	24.05
Milwaukee, ovens	25.25
Indianapolis, ovens	24.25
Chicago, del.	28.12
Cincinnati, del.	25.85
Painesville, O., ovens	25.50
Cleveland, del.	27.43
Erie, Pa., ovens	25.00
Birmingham, ovens	21.65
Cincinnati, del.	27.20
LoneStar,Tex., ovens	18.50
Philadelphia, ovens	23.95
Swedeland, Pa., ovens	23.85
St. Louis, ovens	
St. Louis, del.	26.00
Portsmouth, O. ovens	24.00
Cincinnati, del.	26.62
Detroit, ovens	25.50
Detroit, del.	26.50
Buffalo, del.	28.08
Flint, del.	28.23
Pontiac, del.	27.06
Saginaw, del.	28.58

*Or within $4.55 freight zone from works.

COAL, CHEMICALS

Spot, cents per gallon, ovens	
Pure benzol	30.00-35.00
Toluol, one deg.	30.00-33.00
Industrial xylol	30.00-33.50
Per ton, bulk, ovens	
Sulphate of ammonia	$44-45
Cents per pound, ovens	
Phenol, 40 (carlots, non-returnable drums)	17.25

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 70%, $43; 60%, $40.

Imported, net ton, duty paid, metallurgical grade, $33-$35.

NOTE: Current prices on clad steels appeared on page **111** *Dec. 29, issue.*

STAINLESS STEEL

(Add 4.7% on base price and extras)

Type	Sheets	C.R. Strip	Bars Wire Structurals
301	41.00	34.00	31.25
302	41.25	36.75	31.50
303	43.25	40.25	34.00
304	43.25	38.75	33.00
309	56.00	55.00	44.75
316	57.00	59.00	49.25
321	49.25	48.25	37.00
347	53.75	52.25	41.50
410	36.50	30.50	25.75
416	37.00	37.00	26.25
420	44.00	47.00	31.25
430	39.00	31.00	26.25
501	27.50	26.00	14.25
502	28.50	27.00	15.25

Balt., Types 301-347 and 430 sheets, except 303 and 309 E2.

Brackenridge, Pa. sheets A4 quotes slight variations on Types 301-347.

Bridgeville, Pa., bars, wire, sheets & strip U4.

Butler, Pa. sheets and strip except Types 303, 309, 416, 420, 501 & 502, A10.

Carnegie, Pa., sheets and strip except Types 303, 416, 501 & 502 S18.

Cleveland, strip A7.

Detroit, strip M1 quotes 34.00c on Type 301; 36.50c, 302, 38.50c, 304; 58.50c, 316, 52.00c, 347; 30.50c, 410; 31.00c, 430.

Dunkirk, N. Y., bars, wire A4 quotes slight variations on Types 301-347.

Duquesne, Pa., bars U5.

Fort Wayne, Ind., bars and wire, except Types 501 & 502 J6 quotes slight variations on Types 301-347.

Gary, Ind., sheets except Type 416 U5.

Harrison, N. J., strip and wire C18.

Massillon, O., all items, R2.

McKeesport, Pa., strip, Type 410; bars & wire, Types 410 through 430 and 31.25c on Type 302, 33.75c on 303, 32.75c on 304, 48.75c on 316, 36.75c on 321, 41.25c on 347 F2.

McKeesport, Pa., bars, sheets except Type 416 U5.

Middletown, O., sheets and strip except Types 303, 416, 420, 501 and 502 A10.

Midland, sheets & strip C18.

Munhall, Pa., bars U5.

Muncie, Ind., wire I-7 quotes types 302, 304, 430.

Pittsburgh, sheets C18.

Reading, Pa., strip except 34.25c on Type 301 and 56.00c on 309, bars except 31.50c on Type 301 and 45.25c on 309 C4.

Sharon, Pa., strip, except Types 303, 309, 416, 501, 502 and 34.25c on Type 301 S3.

So. Chicago, Ill., bars & structurals U5.

Syracuse, N. Y., bars, wire & structurals C18.

Titusville, Pa., bars U4.

Wallingford, Conn., strip W2 quotes 0.25c higher.

Washington, Pa., bars, sheets & strip, except 0.25c higher on Type 301 J3.

Washington, Pa., Types 301 through 347 sheets & strip except 303, 309; 316 sheets 62.00c, strip 64.00c W4.

Watervliet, N. Y., structurals & bars A4 quotes variations on Types 301-347.

Waukegan, bars & wire A7.

West Leechburg, Pa., strip, A4 quotes slight variations on Types 301-347.

Youngstown, strip except Types 303, 309, 316, 416, 501 and 502 and 34.25c on Type 301 C8.

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

Sponge iron:	Cents
98+% Fe, annealed	18.00
Unannealed	14.50
Swedish, c.i.f. New York, in bags	8.85-9.95
Electrolytic iron:	
Annealed, 99.5% Fe	42.50
Unannealed (99+% Fe)	36.50
Unannealed (99+% Fe) (minus 325 mesh)	53.50
Powder Flakes	48.50
Carbonyl Iron:	
97.9-99.8% size 5 to 10 microns	83.00-148.00
Aluminum:	
Carlots, freight allowed	31.00
Atomized, 500 lb drums, freight allowed	33.00
Antimony, 500 lb lots	71.00
Brass, 20-ton lots	31.00-34.25
Bronze, 10-ton lots	51.25-60.00
Phosphor-Copper, 20-ton lots	50.00
Copper:	
Electrolytic	37.25
Reduced	35.25
Lead	7.50*
Magnesium	75.00-85.00
Manganese:	
Minus 100 mesh	57.00
Minus 35 mesh	52.00
Minus 200 mesh	62.00
Nickel unannealed	86.00
Nickel-Silver 5-ton lots	46.00
Silicon	38.50
Solder	8.50*
Stainless Steel, 302	83.00
Zinc, 10-ton lots	18.00-31.00
Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh:	
1000 lb and over	5.85
Less than 1000 lb	6.00
Molybdenum:	
99.9%, minus 200 mesh	3.24
Chromium, electrolytic 99% Cr min	3.50

*Plus cost of metal

if you're slowed down by specialty steel shortages —

There's no need to wait around for specialty steel . . . you can find it at your Crucible Warehouse!

That's because we have been able to maintain good stocks of most of our more than 400 steels, despite industry shortages. Moreover, in tool steel, we have *complete* stocks available.

You'll get your Crucible steel quickly, too. One of our many strategically-located warehouses is bound to be within easy delivery distance of your plant.

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Stocks maintained of:
Rex High Speed Steel . . . ALL grades of Tool Steel (including Die Casting and Plastic Die Steel, Drill Rod, Tool Bits and Hollow Drill Steel) . . . Stainless Steel (Sheets, Bars, Wire, Billets, Electrodes) . . . AISI Alloy, Max-el Machinery, Onyx Spring and Special Purpose Steels

CRUCIBLE first name in special purpose steels

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WAREHOUSE STEEL PRODUCTS

(Representative prices, cents per pound for delivery within switching limits, subject to extras.)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140††		Carbon	Floor
New York (city)	6.56	7.57	8.72	6.86		6.89	7.83‡	11.34	6.69	6.90	8.31
JerseyCty(c'try)	6.35	7.27	8.47	6.75		6.59	7.53	9.54	6.39	6.60	8.01
Boston (city)	6.71	7.56	8.74	6.75		6.62	7.69‡	11.38	6.76	6.95	8.18
Boston (c'try)	6.51	7.36	8.54	6.55		6.42	7.49‡	11.18	6.56	6.75	7.98
Phila. (city)	6.36	7.38	8.55	6.70	8.55	6.67	7.70‡	11.04	6.42	6.49	7.62
Phila. (c'try)	6.11	7.13	8.30	6.45	8.30	6.42	7.45‡	10.79	6.17	6.24	7.36
Balt. (city)	6.01	7.37	8.57	6.62		6.61	7.62‡	11.37	6.67	6.67	7.90
Balt. (c'try)	5.81	7.17	8.37	6.42		6.41	7.42‡	11.17	6.47	6.47	7.70
Norfolk, Va.	7.60			...		6.44	8.45		7.25	6.64	7.33
Richmond, Va.	6.14	6.95	8.68	6.53		6.30	7.38		6.58	6.68	7.80
Wash. (w'hse)	6.31	7.61	8.90	6.89		6.90	7.78		6.93	6.95	8.17
Buffalo (del.)	6.00	6.85	8.61	6.41		6.10	7.15‡	11.27	6.28	6.50	7.87
Buffalo (w'hse)	5.80	6.65	8.41	6.21		5.90	6.95‡	11.07	6.08	6.30	7.67
Pitts. (w'hse)	5.80	6.65	8.00	5.94		5.83	6.90‡	10.65	5.95	5.95	7.18
Detroit (w'hse)	6.07	6.92	8.64	6.13	7.70-8.03	6.12	7.10‡	10.92	6.42	6.47	7.52
Cleveland (del.)	6.00	6.85	8.34	6.20		6.09	7.10‡	10.99	6.48	6.32	7.71
Cleve. (w'hse)	5.80	6.65	8.14	6.00		5.89	6.90‡	10.79	6.28	6.12	7.51
Cincin. (city)	6.28	6.87	8.62	6.29		6.28	7.31‡	11.22	6.57	6.62	7.75
Chicago (city)	6.00	6.85	8.20	6.03		6.03	7.00‡	10.85	6.15	6.15	7.38
Chicago (w'hse)	5.80	6.65	8.00	5.83		5.83	6.80‡	10.65	5.95	5.95	7.18
Milwau. (city)	6.17	7.02	8.37	6.20		6.20	7.27‡	11.02	6.32	6.32	7.55
Milwau. (c'try)	5.97	6.82	8.17	6.00		6.00	7.07‡	10.82	6.12	6.12	7.35
St. Louis (del.)	6.30	7.14	8.50	6.34		6.33	7.40‡	11.15	6.55	6.55	7.78
St. L. (w'hse)	6.10	6.94	8.00	6.14		6.13	7.20‡	10.95	6.35	6.35	7.58
Birm'hm (city)	5.95	6.80	7.85[7]	5.95		5.95	8.40		6.10	6.25	8.65
Birm'hm(w'hse)	5.80	6.65	7.70[7]	5.80		5.80	8.40		5.95	6.10	8.65
Los Ang. (city)	6.80	8.65	9.80	6.95	11.40	6.80	8.80‡	12.25	6.80	6.85	9.10
L. A. (w'hse)	6.60	8.45	9.60	6.75	11.20	6.60	8.60‡	12.05	6.60	6.65	8.90
Seattle-Tacoma	7.37	9.17	9.85	7.27	...	7.27	9.62‡	11.90§	6.95	7.20	9.11
S. Fran (w'hse)	6.90	8.20	9.60	6.75		6.65	8.65‡	12.05	6.50	6.75	8.90

Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes 25-cent special bar quality extra; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted. Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; [7] 500 to 1499 lb; [8] 450 to 1499 lb; [9] 1000 to 1999 lb.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural), lower lake ports

Old range bessemer	$9.45
Old range nonbessemer	9.30
Mesabi bessemer	9.20
Mesabi nonbessemer	9.05
High phosphorus	9.05

After adjustment for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 1, 1950, in applicable lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

Eastern Local Iron Ore

Cents per unit del. E. Pa.

Foundry and basic 56-62% concentrates contract	17.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	nom.
Long-term contract	24.00
North African hematites (spot)	26.00-2 .00
Brazilian iron ore, 67-69% (spot)	32.00

Tungsten Ore

Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$65.00
Domestic scheelite, mines	65.00

Manganese Ore

Manganese, 48% nearby, $1.18-$1.22 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 85c-87c.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$39.00-$42.00
48% 3:1	44.00-45.00
48% no ratio	30.00-32.00

South African Transvaal

44% no ratio	$27.00-$28.00
48% no ratio	34.00-35.00

Brazilian

44% 2.5:1 lump	nom.

Domestic

(Rail nearest seller)

48% 3:1	$39.00

Molybdenum

Sulphide concentrates per lb, molybdenum content, mines	$1.00

REFRACTORIES

(Ceiling prices, effective Sept. 23, 1952, per 1000 units)

Fire Clay Brick

High-Heat Duty: Pueblo, Colo., $89.00; Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lochhaven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., Woodbridge, N. J., $99.30; Salina, Pa., $104.55; Niles, O., $109; Los Angeles, Pittsburg, Calif., $132.30.

Silica Brick

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., $99.30; Hays, Pa., $105.10; Niles, O., $107; E. Chicago, Ind., Joliet, Rockdale, Ill., $109.70; Cutler, Utah, $116.55; Los Angeles, $122.85.

Insulating Fire Brick

2300° *F*: Massillon, O., $178.50; Clearfield, Pa., $179.55; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $186.90.

Ladle Brick

Dry Pressed: **Bessemer, Ala., $64.60; Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Wellsville, O., $69.30; Mexico, Mo., $73.50; Clearfield, Pa., Portsmouth, O., $83; Perla, Ark., $92.40; Los Angeles, $110.25; Pittsburg, Calif., $111.30.**

Sleeves

Reesdale, Pa., $127; Johnstown, Pa., $127.30; Clearfield, Pa., $135; St. Louis, $138; Athens, Tex., $140.90.

Nozzles

Reesdale, Pa., $203.20; Johnstown, Pa., $208.40; Clearfield, Pa., $219.45; St. Louis, $224.65; Athens, Tex., $225.20.

Runners

Reesdale, Pa., $158.20; Johnstown, Pa., $161.70; Clearfield, Pa., $168.60; St. Louis, $170.30; Athens, Tex., $174.40.

High-Alumina Brick

50 Per Cent: Clearfield, Pa., St. Louis, Mexico, Mo., $166.30; Danville, Ill., $169.30.
60 Per Cent: St. Louis, Mexico, Vandalia, Mo., $210.20; Danville, Ill., $213.20.
70 Per Cent: St. Louis, Mexico, Vandalia, Mo., $244.85; Danville, Ill., $247.85; Clearfield, Pa., $252.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot add 0.25c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Contract, c.l. lump, bulk 7.0c per lb of alloy, c.l. packed 7.75c, ton lot 8.5c, less ton 9.35c, delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 14.50c per lb of briquet, carload packed 15.2c, ton 16.0c, less ton 16.9c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 12.45c per lb of briquet, c.l. packaged 13.25c, ton lot 14.05c, less ton 14.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.65c per lb of briquet, c.l. packed 13.45c, ton lot 14.25, less ton 15.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size — weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.95c per lb of briquet, c.l. packed 7.75c, ton lot 8.85c, less ton 9.45c. Delivered. Spot, add 0.25c.

(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 7.1c, c.l. packed 7.9c, ton lot 8.7c, less ton 9.6c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

Note: Current prices on chromium, silicon, vanadium, boron and tungsten alloys appeared on page 107, Dec. 22 issue; manganese and titanium alloys and "other" ferroalloys, page 113, Dec. 29.

CEILING PRICES, IRON AND STEEL SCRAP

Prices as set forth in Office of Price Stabilization ceiling price regulation No. 5, as amended Feb. 5, 1952

STEELMAKING SCRAP COMPOSITE

Jan. 1	$43.00
Dec. 24	43.00
Dec., 1952	43.00
Jan., 1952	43.00
Jan., 1948	40.75

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

Basing point ceiling prices per gross ton from which maximum shipping prices are computed on scrap of dealer and industrial origin, and from which ceiling on-line and ceiling delivered prices are computed on scrap of railroad origin.

Grade 1

Basing Point	No. 1 Bundles Dealer, Industrial	No. 1 Heavy Melt Railroad
Alabama City, Ala.	$39.00	$41.00
Ashland, Ky.	42.00	44.00
Atlanta, Ga.	39.00	41.00
Bethlehem, Pa.	42.00	44.00
Birmingham, Ala.	39.00	41.00
Brackenridge, Pa.	44.00	46.00
Buffalo, N. Y.	43.00	45.00
Butler, Pa.	44.00	46.00
Canton, O.	44.00	46.00
Chicago, Ill.	42.50	44.50
Cincinnati, O.	43.00	45.00
Claymont, Del.	42.50	44.50
Cleveland, O.	43.00	45.00
Coatesville, Pa.	42.50	44.50
Conshohocken, Pa.	42.50	44.50
Detroit, Mich.	41.15	43.15
Duluth, Minn.	40.00	42.00
Harrisburg, Pa.	42.50	44.50
Houston, Tex.	37.00	39.00
Johnstown, Pa.	44.00	46.00
Kansas City, Mo.	39.50	41.50
Kokomo, Ind.	42.00	44.00
Los Angeles	35.00	37.00
Middletown, O.	43.00	45.00
Midland, Pa.	44.00	46.00
Minnequa, Colo.	38.00	40.00
Monessen, Pa.	44.00	46.00
Phoenixville, Pa.	42.50	44.50
Pittsburg, Calif.	35.00	37.00
Pittsburgh, Pa.	44.00	46.00
Portland, Oreg.	35.00	37.00
Portsmouth, O.	42.00	44.00
St. Louis, Mo.	41.00	43.00
San Francisco	35.00	37.00
Seattle, Wash.	35.00	37.00
Sharon, Pa.	44.00	46.00
Sparrows Pt., Md.	42.00	44.00
Steubenville, O.	44.00	46.00
Warren, O.	44.00	46.00
Weirton, W. Va.	44.00	46.00
Youngstown, O.	44.00	46.00

Differentials from Base

Differentials per gross ton for other grades of dealer and industrial scrap:

O-H and Blast Furnace Grades

2. No. 1 Busheling	Base
3. No. 1 Heavy Melting	— $1.00
4. No. 2 Heavy Melting	1.00
5. No. 2 Bundles	1.00
6. Machine Shop Turnings	10.00
7. Mixed Borings and Short Turnings	6.00
8. Shoveling Turnings	6.00
9. No. 2 Busheling	4.00
10. Cast Iron Borings	6.00

Elec. Furnace and Fdry. Grades

11. Billet, Bloom & Forge Crops	+ 7.50
12. Bar Crops & Plate	+ 5.00
13. Cast Steel	+ 5.00
14. Punchings & Plate Scrap	+ 2.50
15. Electric Furnace Bundles	+ 2.00
Cut Structurals & Plate:	
16. 3 feet and under	+ 3.00
17. 2 feet and under	+ 5.00
18. 1 foot and under	+ 6.00
19. ~~Briquetted~~ Cast Iron Borings	Base
Foundry, Steel:	
20. 2 feet and under	Base
21. 1 foot and under	+ 2.00
22. Springs and Crankshafts	+ 1.00
23. Alloy Free Turnings	— 3.00
24. Heavy Turnings	1.00
25. Briquetted Turnings	Base
26. No. 1 Chemical Borings	3.00
27. No. 2 Chemical Borings	1.00
28. Wrought Iron	+ 10.00
29. Shafting	+ 10.00
31. Old Tin & Terne Plated Bundles	10.00

Unprepared Grades

When compressed constitutes:

32. No. 1 Bundles	6.00
33. No. 2 Bundles	— 9.00
34. Other than material suitable for hydraulic compression	8.00

Restrictions on Use

(1) Prices for Grades 11 and 23 may be charged only when shipped to a consumer directly from an industrial producer; otherwise ceiling prices shall not exceed prices established for grades 12 and 8, respectively.

(2) Prices established for Grades 26 and 27 may be charged only when sold for use for chemical or annealing purposes, and in the case of Grade 27, for briquetting and direct charge into an electric furnace; otherwise ceiling prices shall not exceed price established for Grade 10.

(3) Prices established for Grade 28 may be charged only when sold to a producer of wrought iron; otherwise ceiling price shall not exceed ceiling price for corresponding grade of basic open-hearth.

(4) Premiums for Grades 11-18, 20 and 21 may be charged only when sold for use in electric and acid open-hearth furnaces or foundries; or in basic O-H or blast furnace under NPA allocation or OPS authorization.

(5) Prices for Grade 29 may be charged only when sold for forging or rerolling purposes.

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 railroad heavy melting steel) for other grades of railroad steel scrap:

2. No. 2 Heavy Melting Steel	$2.00
3. No. 2 Steel Wheel	Base
4. Hollow Bored Axles and loco. axles with keyways between the wheelseats	Base
5. No. 1 Busheling	3.50
6. No. 1 Turnings	3.00
7. No. 2 Turnings, Drillings & Borings	12.00
8. No. 2 Cast Steel and uncut wheelcenters	6.00
9. Uncut Frogs, Switches	Base
10. Flues, Tubes & Pipes	8.00
11. Structural, Wrought Iron and/or steel, uncut	6.00
12. Destroyed Steel Cars	8.00
13. No. 1 Sheet Scrap	9.50
14. Scrap Rails, Random Lengths	2.00
15. Rerolling Rails	+ 7.00
Cut Rails:	
16. 3 feet and under	+ 5.00
17. 2 feet and under	6.00
18. 18 inches and under	+ 8.00
19. Cast Steel, No. 1	3.00
20. Uncut Tires	2.00
21. Cut Tires	+ 5.00
Bolsters & Side Frames:	
22. Uncut	Base
23. Cut	+ 3.00
24. Angles, Splice Bars & Tie Plates	5.00
25. Solid Steel Axles	+ 12.00
26. Steel Wheels, No. 3, oversize	Base
27. Steel Wheels, No. 3	+ 5.00
28. Spring Steel	5.00
29. Couplers & Knuckles	5.00
30. Wrought Iron	+ 8.00
31. Fireboxes	8.00
32. Boilers	6.00
33. No. 2 Sheet Scrap	13.00
34. Carsides, Doors, Car Ends, cut apart	6.00
35. Unassorted Iron & Steel	6.00
36. Unprepared scrap, not suitable for hydraulic compression	8.00

Preparation Charges

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of dealer or industrial origin, authorized by OPS are:

(1) For preparing into Grades No. 3, No. 4 or No. 2, $8.
(2) For hydraulically compressing Grade No. 1, $6 per ton; Grade No. 5, $8.
(3) For crushing Grade No. 6, $3.
For preparing into:
(4) Grade No. 25, $6.
(5) Grade No. 19, $6.
(6) Grades No. 12, No. 13, No. 14, No. 16, or No. 20, $10.
(7) Grade No. 17 or No. 21, $11.
(8) Grade No. 18, $12.
(9) For hydraulically compressing Grade No. 15, $8.
(10) For preparing into Grade No. 28, $10.

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of railroad origin shall be:

(1) For preparing into Grade No. 1 and Grade No. 2, $8.
(2) For hydraulically compressing Grade No. 13, $6
For preparing into:
(3) Grade No. 16, $4
(4) Grade No. 17, $5.
(5) Grade No. 18, $7.
(6) Grade No. 21, $4.
(7) Grade No. 23, $4.

Ceiling fees per gross ton which may be charged for intransit preparation of cast iron are limited to:

(1) For preparing Grade No. 8 into Grade No. 7, $9.
(2) For preparing Grade No. 3 into Grade No. 11, $7.
(3) For preparing Grade No. 3 into Grade No. 1, $4.

CAST IRON SCRAP

Ceiling price per gross ton for following grades shall be f.o.b. shipping point:

Cast Iron

1. No. 1 (Cupola)	$49.00
2. No. 2 (Charging Box)	47.00
3. No. 3 (Hvy. Breakable)	45.00
4. No. 4 (Burnt Cast)	41.00
5. Cast Iron Brake Shoes	41.00
6. Stove Plate	46.00
7. Clean Auto Cast	52.00
8. Unstripped Motor Blocks	43.00
9. Wheels, No. 1	47.00
10. Malleable	55.00
11. Drop broken machinery	52.00

OPEN MARKET

(Delivered prices include broker's commission.)

Birmingham
(Delivered)

Shoveling turnings	$30.00-32.00
Cast iron borings	30.00-32.00
No. 1 cupola cast	47.00-48.00
Stove plate	42.00
Charging box cast	39.00-40.00
Heavy breakable	36.00-37.00
Drop broken machinery	42.00-43.00
Unstripped motor blocks	35.00-36.00

Boston
(F.o.b. shipping point)

No. 1 cupola cast	41.00
Heavy breakable	36.00
Stove plate	34.00-35.00
Unstripped motor blocks	30.00

Buffalo
(Delivered)

No. 1 heavy melting	43.00
No. 2 heavy melting	43.00
No. 1 bundles	44.00
No. 1 busheling	44.00
No. 2 bundles	43.00
Machine shop turnings	34.00
Mixed borings, turnings	38.00
Cast iron borings	38.00
Short shoveling turnings	38.00
No. 1 cupola cast	45.50-46.50
No. 1 machinery cast	49.00-50.00

Chicago
(Delivered)

No. 2 heavy melting	42.50
No. 2 bundles	42.50
Machine shop turnings	30.50-32.50
Mixed borings, turnings	34.50-36.50
Shoveling turnings	34.50-36.50
Cast iron borings	34.50-36.50
No. 1 cupola cast	43.00-45.00
Charging box cast	41.00-43.00
Heavy breakable	38.00-40.00
Burnt cast	37.00-39.00
Cast iron brake shoes	39.00-41.00
Stove plate	41.00-43.00
Clean auso cast	44.00-46.00
Unstripped motor blocks	35.00-37.00
Malleable	46.00-48.00
Drop broken machinery	46.00-48.00

Cleveland
(Delivered)

No. 1 heavy melting	43.00
No. 2 heavy melting	43.00
No. 1 bundles	44.00
No. 2 bundles	43.00
Machine shop turnings	34.00
Mixed borings, turnings	38.00
Shoveling turnings	38.00
Cast iron borings	38.00
(F.o.b. shipping point)	
No. 1 cupola	49.00
Charging box cast	47.00
Burnt cast	41.00
Stove plate	46.00
Clean auto cast	52.00
Unstripped motor blocks	43.00
Malleable	55.00
Drop broken machinery	52.00

Detroit
(F.o.b. shipping point)

No. 1 cupola cast	47.00-48.00
Heavy breakable	43.00-44.00
Clean auto cast	49.00-50.00
Unstripped motor blocks	40.00-41.00
Drop broken machinery	50.00-52.00
Charging box cast	44.00-45.00

Los Angeles
(Delivered)

No. 1 heavy melting	34.00
No. 2 heavy melting	29.00
No. 1 bundles	35.00
No. 2 bundles	29.00
No. 1 cupola cast	46.00
Machine shop turnings	14.00

New York
(Brokers' buying prices)

No. 2 heavy melting	35.99
Mixed borings, turnings	29.99
Machine shop turnings	25.99
Cupola cast	40.00-41.00
Unstripped motor blocks	31.00-32.00

Philadelphia

No. 1 heavy melting	41.50†
No. 2 heavy melting	41.50†
No. 1 bundles	42.50†
No. 2 bundles	41.50†
No. 1 busheling	42.50†
Mixed borings, turnings	36.50†
Machine shop turnings	32.50†
Short shoveling turnings	36.50†
No. 1 cupola cast	45.00-46.00††
Unstripped motor blocks	38.00††
Heavy breakable	47.50††
Machinery cast	52.00††
Charging box cast	47.50††

† Ceiling price. ‡ Nominal.
§ Shipping point. †† Delivered

Pittsburgh
(Delivered)

No. 2 heavy melting	44.00†
No. 1 bundles	45.00†
No. 2 bundles	44.00†
Machine shop turnings	35.00†
Shovel turnings	39.00†
No. 1 cupola cast	48.50
Heavy breakable	45.00

† Ceiling price.

San Francisco
(Delivered)

No. 2 heavy melting	29.00
Machine shop turnings	14.00
No. 2 bundles	29.00
No. 1 cupola cast	41.00

Seattle
(F.o.b. shipping point)

No. 1 bundles	30.00
No. 1 cupola cast	41.00
Heavy breakable	36.00-38.00
Unstripped motor blocks	31.00

St. Louis
(Delivered)

No. 1 cupola	48.00
Unstripped motor blocks	37.00

Youngstown
(Delivered)

No. 2 heavy melting	43.00
No. 2 bundles	43.00
Machine shop turnings	34.00

HAMILTON, ONT.
(Delivered Prices)

Heavy Melt	$35.50
No. 1 Bundles	35.50
No. 2 Bundles	35.50
Mechanical Bundles	32.00
Mixed Steel Scrap	31.50
Mixed Borings, Turnings	32.50
Rails, Remelting	35.50
Rails, Rerolling	44.80
Busheling	30.00
Busheling new factory:	
Prep'd	33.50
Unprep'd	31.50
Short Steel Turnings	32.50
Cast Iron Grades†	
No. 1 Machinery Cast	50.00

† F.o.b., shipping point.

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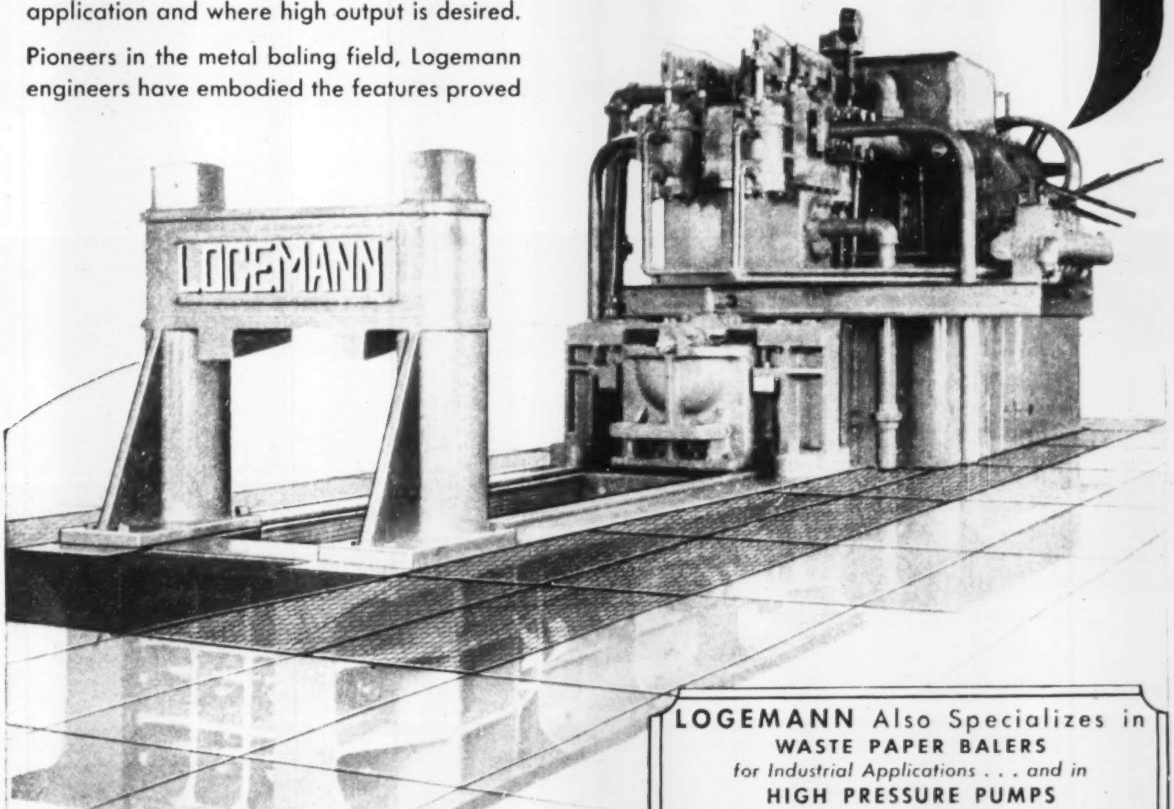

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The Metal Market

Metals shortages are expected to be the exception rather than the rule in 1953, for this is the year expanded production of metals should catch up with demands

THE great squeeze in metals is approaching an end. Shortages will become the exception rather than the rule as 1953 unfolds. After a two-and-a-half-year absence, many characteristics of normal market operation will return. From the standpoint of producers, and fabricators, the year promises to be another good one, with more metal available and fewer restrictions on use. Consumption is still accelerating despite more than a decade of unparalleled industrial activity. This is the year production should catch up with it in the Korea-inspired race.

While the general outlook calls for optimism, the situation varies with individual metals. Here's how the major ones stacked up in 1952 and what to expect in 1953.

Aluminum

Three expansion waves since Korea will add 885,325 tons of capacity to the aluminum industry that was equipped to produce 730,225 tons of ingots in mid-1950. Together with an estimated 600,000-ton Canadian smelting capacity expected in 1955, North America will soon be capable of pouring over 2 million ingot tons of aluminum yearly.

In 1952, a new U. S. aluminum production record of 930,000 tons was set. Next year 1.25 million tons are expected and 1954 should see 1.5 million tons poured. Mill product prices are due for a further rise this year.

Copper

Demise of price controls undoubtedly will see higher price tags on U. S. copper. Foreign copper jumped 25 per cent last year when Chile put on the squeeze. With complete price decontrol, a leveling-off of domestic and foreign prices slightly below 30 cents can be expected after the novelty wears off and immediate demand is dulled.

Refined copper production in 1952, as reported by Copper Institute members, reached a postwar high of 2.36 million tons. Deliveries to fabricators of about 2.43 million tons did the same.

This year the metal's consumers will get an average of around 135,000 tons of copper monthly, less than 20 per cent of which will be needed for defense. A definite easing in copper by mid-year is likely.

Lead

U. S. consumers and the national stockpile had 1.3 million tons of lead available in 1952, more than in 1951 but less than in 1950. They'll have all they need in '53 unless mine closings cut into production. Lead moved all the way down the ladder in 1952, from what was termed critical scarcity to outright abundance.

Price dropped 4.75 cents from this time last year, but a 15 or 16-cent lead this year can be expected.

Magnesium

Most remarkable production gain of any metal during 1952 was the 157 per cent rise in magnesium output. Reactivation of government plants helped in the turnout of 105,286 tons, as estimated by Dow Chemical Co. That's highest since 1944 and almost as much as the entire postwar production. U. S. capacity today is 131,000 tons. Price held firm at 24.50 cents a pound during 1952, but demand for magnesium today leaves much to be desired. About half of the present output goes into stockpile and shutdown of government plants will occur soon unless war intervenes.

Nickel

U. S. supply of nickel during 1952 was 110,000 tons; free-world production was 157,500 tons. Only price move of the year was a Capehart increase granted one mill Further price rise in 1953 is possible because of tremendous demand. Controls over nickel will stay on in '53 though use restrictions may be eased.

Tin

About nine-tenths of the tin sold in this country in 1952 came from RFC. This year will see a sharp reversal of the practice, with private trading accounting for a majority of sales. The stockpile should be at a level to permit freer use of tin

Zinc

The worst is over for zinc, the metal that plummeted into plenty during 1952 and lost 36 per cent of its price in the process. Some degree of price recovery will undoubtedly occur during the year. Slab zinc output in 1952 amounted to about 960,000 tons, a close second to the all-time high of 1943. Production will be down in the first half of this year because of wholesale mine closings accompanying the price drop. It could cause a market tightening toward the middle of the year

Plan Aluminum Facade

Superimposed on a photograph of its future site is this scale model of a New York skyscraper using a novel all-aluminum facade. Tishman Realty & Construction Co. Inc. will erect the 26-story building, using about 1800 die-pressed aluminum wall and window panels bolted to the building's framework. Builders expect the outside will maintain newness indefinitely because of weather-resisting properties of the aluminum alloy

Minor Metals

Antimony slid 15.5 cents during 1952 and will be plentiful this year at 34.50 or below. **Cadmium** dropped almost a dollar a pound but rallied to $1.75 to $2.00 at the turn of the year. Imports have wreaked havoc in both these metals and will keep price competition sharp throughout the year. **Cobalt** supply is easing though defense uses continue strong. Price held firm through '52. Expansion program calls for supply of 13,500 tons by 1955. **Mercury** moved all over the price lot in the last year, winding up about $3 a flask higher than a year ago

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 24.50c, Conn. Valley; Lake 24.62½c, delivered.

Brass Ingots: 85-5-5-5 (No. 115) 27.25c; 88-10-2 (No. 215) 46.00c; 80-10-10 (No. 305) 33.00c; No. 1 yellow (No. 405) 23.25c.

Zinc: Prime western 12.50c; brass special 12.75c, intermediate 13.00c, East St. Louis, high grade 13.85c, delivered.

Lead: Common 14.30c, chemical 14.40c, corroding, 14.40c, St. Louis.

Primary Aluminum: 99% plus, ingots 20.00c, pigs 19.00. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb c.l. orders.

Secondary Aluminum: Piston alloys 20.50c, No. 12 foundry alloy (No. 2 grade) 19.50c; steel deoxidizing grades, notch bars, granulated or shot. Grade 1, 18.80c, grade 2, 18.60c, grade 3, 18.40c, grade 4, 18.20c.

Magnesium: Commercially pure (99.8%) standard ingots 10,000 lb and over 24.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt 121.50c.

Antimony: American 99-99.8% and over but not meeting specifications below 34.50c; 99.8% and over (arsenic 0.05% max., other impurities 0.1% max.) 35.00c; f.o.b. Laredo, Tex., for bulk shipment.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 56.50c; 25-lb pigs, 59.15c; "XX" nickel shot, 60.15c; "F" nickel shot or ingots, for addition to cast iron, 56.50c. Prices include import duty.

Mercury: Open market, spot, New York, $215-$218, nominal, per 76-lb flask.

Beryllium Copper: 3.75-4.25% Be, $1.595 per lb of alloy, f.o.b. Reading, Pa.

Cadmium: "Regular" straight or flat forms $1.75-$2 del.; special or patented shapes $2.15.

Cobalt: 97-99%, $2.40 per lb for 500 lb (kegs); $2.42 per lb for 100 lb (case); $2.47 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York 83.25c per oz.

Platinum: $90-$93 per ounce from refineries.

Palladium: $23-$24 per troy ounce.

Iridium: $175-$185 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Ceiling prices, cents per pound, f.o.b. mill effective July 1, 1952)

Sheet: Copper 45.52; yellow brass 40.17; commercial bronze, 95% 45.15, 90% 44.38; red brass, 85% 43.10, 80% 42.34, best quality 41.35; nickel silver, 18%, 55.08; phosphor-bronze grade A, 5%, 64.71.

Rod: Copper, hot-rolled 41.37, cold-drawn 42.62; yellow brass free cutting, 33.85; commercial bronze 95% 44.84; 90% 44.07; red brass 85% 42.79; 80% 42.03.

Seamless Tubing: Copper 45.56; yellow brass 43.18; commercial bronze, 90%, 47.04; red brass, 85%, 46.01.

Wire: Yellow brass 40.46; commercial bronze 95%, 45.44; 90%, 44.67; red brass, 85%, 43.39; 80%, 42.63; best quality brass, 41.64.

(Base prices, effective July 1, 1952)

Copper Wire: Bare, soft, f.o.b. eastern mills 100,000 lb lots, 32.795; 30,000 lb lots, 32.92; l.c.l., 33.42. Weatherproof, 100,000 lb, 33.60; 30,000 lb, 33.85c; l.c.l., 34.35. Magnet wire del., 15,000 lb or more, 38.75; l.c.l., 39.50.

ALUMINUM

(30,000 lb base, freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. order. Effective Aug. 4, 1952.)

Sheets and Circles: 2s and 3s mill finish c.l.

Thickness Range Inches	Widths or Diameters, In. Inc.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	31.6		...
0.135-0.096	12-48	32.1		...
0.095-0.077	12-48	32.8	30.6	34.9
0.076-0.061	12-48	33.4	30.8	35.1
0.060-0.048	12-48	33.7	31.0	35.4
0.047-0.038	12-48	34.1	31.3	35.7
0.037-0.030	12-48	34.5	31.7	36.3
0.029-0.024	12-48	35.1	32.0	36.8
0.023-0.019	12-36	35.7	32.7	37.5
0.018-0.017	12-36	36.4	33.3	38.4
0.016-0.015	12-36	37.3	34.0	39.5
0.014	12-24	38.3	35.0	40.8
0.013-0.012	12-24	39.3	35.7	41.7
0.011	12-24	40.3	36.8	43.3
0.010-0.0095	12-24	41.4	37.9	44.8
0.009-0.0085	12-24	42.6	39.1	46.6
0.008-0.0075	12-24	44.0	40.3	48.4
0.007	12-18	45.5	41.7	50.6
0.006	12-18	47.0	43.1	55.4

* Lengths 72 to 180 inches. † Maximum diameter, 26 inches.

Screw Machine Stock: 5000 lb and over

Dia. (in.) or distance across flats	Round R317-T4 17S-T4	Hexagonal R-317-T4	Hexagonal 17S-T4
0.125	54.6	...	...
0.156-0.188	46.2	...	...
0.219-0.313	43.6	...	...
0.375	42.0	48.3	50.4
0.406	42.0	...	...
0.438	42.0	48.3	50.4
0.469	42.0	...	...
0.500	42.0	48.3	50.4
0.531	42.0		
0.563	42.0		47.3
0.594	42.0		
0.625	42.0	45.7	47.3
0.688	42.0	...	47.3
0.750-1.000	41.0	43.1	44.6
1.063	41.0		43.1
1.125-1.500	39.4	41.5	43.1
1.563	38.9	...	...
1.625	38.3	...	41.5
1.688-2.000	38.3		

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, Full rolls, 140 sq ft or more $19.25 per cwt; add 50c cwt 100 sq ft to 140 sq ft. Pipe: Full coils $19.25 per cwt. Traps and bends: List prices plus 43%.

ZINC

Sheets 23.00c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 19.50-20.50c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 20.75-21.75c; over 12-in., 20.75-21.75c.

"A" NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 77.00c. Strip, cold-rolled 83.00c. Rods and shapes, 73.00c. Plates, 75.00c. Seamless tubes, 106.00c.

MONEL

(Base prices f.o.b. mill)

Sheets, cold-rolled 60.50c. Strip, cold-rolled 63.50c. Rods and shapes, 58.50c. Plates, 59.50c. Seamless tubes, 93.50c. Shot and blocks, 53.50c.

MAGNESIUM

Extruded Rounds 12 in. long, 1.31 in. in diameter, less than 25 lb, 55.00-62.00c; 25 to 99 lb, 45.00-52.00c; 100 lb to 5000 lb, 41.00c.

TITANIUM

(Prices per lb; 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, $6.

Plating Materials

Chromic Acid: 99.9% flakes, f.o.b. Philadelphia, carloads 27.00c; 5 tons and over 27.50c; 1 to 5 tons, 28.00c; less than 1 ton 28.50c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat, rolled, 38.34c; oval 37.84c.

Nickel Anodes: Rolled oval, carbonized, carloads, 74.50c; 10,000 to 30,000 lb 75.50c; 3000 to 10,000 lb 76.50c; 500 to 3000 lb 77.50c; 100 to 500 lb, 79.50c; under 100 lb 82.50c; f.o.b. Cleveland.

Nickel Chloride: 36.50c in 100 lb bags; 34.50c in lots of 300 lb through 10,000 lb; 34.00c over 10,000 lb; f.o.b. Cleveland, freight allowed on 300 lb or more.

Sodium Stannate: 25 lb cans only, less than 100 lb to consumers 86.7c; 100 or 350 lb drums only, 100 to 600 lb 71.60c; 700 to 1900 lb, 69c; 2000 to 9900 lb, 67.3c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Tin Anodes: Bar, 1000 lb and over, $1.42; 500 to 999 lb, $1.425; 200 to 499 lb, $1.43; less than 200 lb, $1.445. Freight allowed east of Mississippi and north of Ohio and Potomac.

Zinc Cyanide: 100 lb drums, less than 10 drums 54.30c, 10 or more drums, 52.30c, f.o.b. Niagara Falls, N. Y.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb $1.11; more than 2000 lb $1.09. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Stannous Chloride (Anhydrous): In 400 lb bbl, 98.5c; 100 lb kegs 99.5c. Freight allowed.

Scrap Metals

Brass Mill Allowances

Ceiling prices in cents per pound for less than 20,000 lb f.o.b. shipping point effective June 26, 1951.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.50	21.50	20.75
Yellow Brass	19.125	18.875	17.875
Commercial Bronze			
95%	20.50	20.25	19.75
90%	20.50	20.25	19.75
Red Brass			
85%	20.25	20.00	19.375
80%	20.125	19.875	19.375
Muntz metal	18.125	17.875	17.375
Nickel silver, 10%	21.50	21.25	10.75
Phos. Bronze, 5%	25.25	25.00	24.00

Copper Scrap Ceiling Prices

(Base prices, cents per pound, less than 40,000 lb f.o.b. point of shipment)

Group 1: No. 1 copper 19.25; No. 2 copper wire and mixed heavy 17.75; light copper 16.50; No. 1 borings 19.25; No. 2 borings 17.75; refinery brass, 17.00 per lb of dry Cu content for 50 to 60 per cent material and 17.25 per lb for over 60 per cent material.
Group II: No. 1 soft red brass solids 18.50; No. 1 composition borings 19.25 per lb of Cu content plus 63 cents per lb of tin content; mixed brass borings 19.25 per pound of Cu content plus 60 cents per lb of tin content; unlined red car boxes 18.25; lined red car boxes 17.25; cocks and faucets 16.00; mixed brass screens 16.00; zincy bronze solids and borings 16.25.

Aluminum Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment, less than 5000 lb)

Segregated plant scrap: 2s solids, copper free, 10.50; high grade borings and turnings, 8.50; No. 12 piston borings and turnings, 7.50. Mixed plant scrap: Copper-free solids, 10.00; dual type 9.00. Obsolete scrap: Pure old cable 10.00, sheet and sheet utensils, 7.25; old castings and forgings, 7.75, clean pistons, free of struts, 7.75; pistons with struts, 5.75.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Lead: Heavy 10.75-11.25; battery plates 5.90-6.15; linotype and stereotype 12.50-13.00; electrotype 10.75-11.00; mixed babbitt 13.75-14.00.
Zinc: Old zinc, 5.50-6.00; new die cast scrap, 5.50-6.00; old die cast scrap, 4.00-4.50.

DAILY PRICE RECORD

1952	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Jan. 2-3	24.50	14.30	12.50	121.50	20.00	34.50	56.50	83.25
Dec. 29-31	24.50	14.30	12.50	121.50	20.00	34.50	56.50	83.25
Dec. 22-27	24.50	14.05	12.50	121.50	20.00	34.50	56.50	82.25
Dec. 1-20	24.50	13.80	12.50	121.50	20.00	34.50	56.50	83.25
Nov. 24-29	24.50	13.80	12.50	121.50	20.00	34.50	56.50	83.25
Nov. 20-22	24.50	14.05	12.50	121.50	20.00	34.50	56.50	83.25
Nov. 12-19	24.50	14.30	12.50	121.50	20.00	34.50	56.50	83.25
Dec. Avg.	24.50	13.906	12.50	121.50	20.00	34.50	56.50	83.25
Nov. Avg.	24.50	13.965	12.50	121.50	20.00	34.688	56.50	83.25
Oct. Avg.	24.50	14.226	13.259	121.50	20.00	39.00	56.50	83.25
Sept. Avg.	24.50	15.80	13.99	121.50	20.00	39.00	56.50	83.25
Aug. Avg.	24.50	15.80	14.067	121.50	19.923	39.00	56.50	83.25
July Avg.	24.50	15.80	15.00	121.50	19.00	39.00	56.50	82.885
June Avg.	24.50	15.06	15.74	121.50	19.00	39.00	56.50	82.75
Jan. 1952 Avg.	24.50	18.80	19.50	109.404	19.00	50.00	56.50	88.00
Jan. 1948 Avg.	21.50	14.825	11.056	94.00	15.00	33.00	33.75	74.625

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del.; Antimony, bulk f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9% base sizes at refinery unpacked. Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

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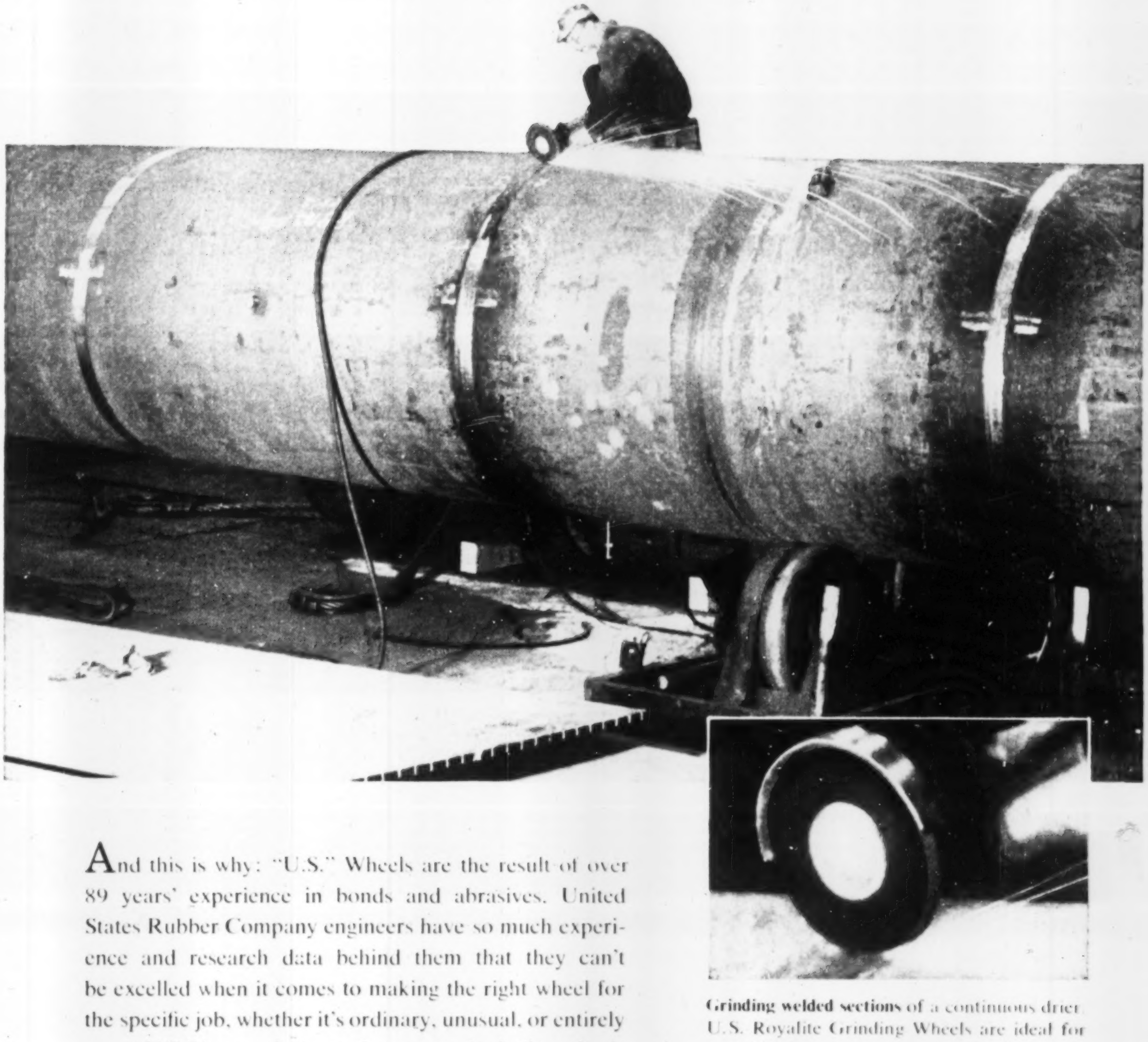

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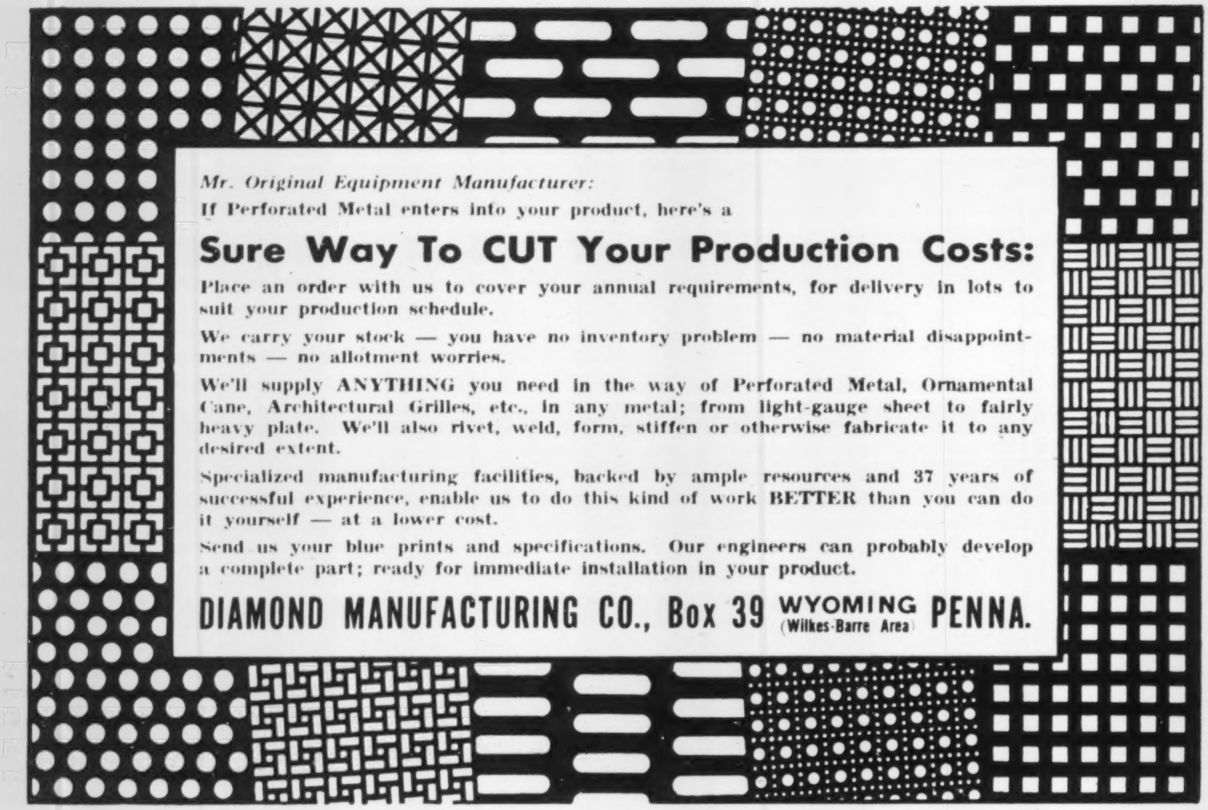

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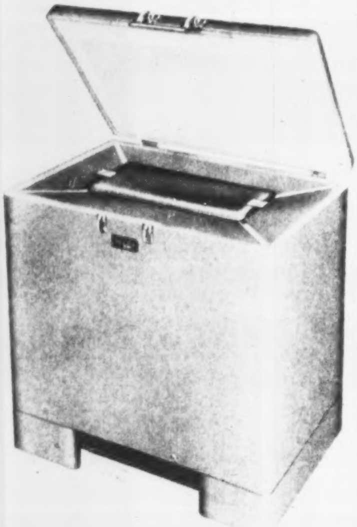

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Wire . . .

Wire Prices, Page 549

Boston—Among hundreds of wire products order books and backlogs naturally vary widely. Some lag with openings in March, numerous fine wire specialties, nail wire and music wire included. Other finished wires are taken up and extend into second quarter. There is some improved ordering for second quarter with pressure heaviest for items entering into automobile assembly. There is also some forward buying of manufacturers wire. Screw requirements are stabilized at allotment levels through the next three months, exceptions covering specialties in cold-heading grades.

Steel Bars . . .

Bar Prices, Page 547

Philadelphia—Hot carbon bar producers are booking second quarter orders on a conservative basis, this being true even in cases where books have been opened for the entire quarter, instead of on a monthly basis. Supply may be a little heavier in second quarter due primarily to scheduled increases in steel capacity. However, a tight situation is expected to prevail, particularly in shell sizes, ranging 2-in. and heavier. Much additional shell work is being figured currently.

Boston—Depending on how the pie is cut, there is lack of unity as to how soon controls on hot-rolled bar distribution will be lifted. Converters and warehouses with fixed allotments fear they may lose some tonnage which is now practically guaranteed. Converters in some cases are actually getting excess quota volume. Commercial consumers, on the other hand, think they would fare better without controls, limited number of high priority holders excepted. Also military set-asides on bars which will be continued in any event, are somewhat larger than for most steel products. Ultimate answer is an increase in the over-all production of bars. Output at Morrisville, Pa. may contribute part of this in late 1953.

New York—All carbon bar sellers have opened books for second quarter, or at least for the first month of the period. Those opening only for April, however, were no sooner in the market than they were out, as they had little space for new tonnage, due to allowances for carryovers. More new tonnage will be available in second quarter than in the first by a wide margin. As may be recalled, the first two months of the first quarter were largely absorbed by fourth quarter tickets under a special arrangement set up to cushion the effects of the steel strike last summer. In second quarter there will be no such wholesale carryover of tickets from the preceding quarter.

Pittsburgh — Steel bar producers are looking forward to good business through second quarter if present customer pressure is any indication. Books have been opened for second quarter, but mills are currently negotiating quotas and say it is a little early to make concrete statements about availability.

Cleveland — Indications are that short supplies of large-size carbon bars will hamper manufacturing operations through first half of the year. Smaller sizes are fairly plentiful and no particular trouble is seen on that score. But continued strong military requirements, and possibility of even stronger demand on this account should the world political situation worsen, or the Korean war be stepped up, serve to dampen hope for any marked improvement in supply conditions soon.

Chicago—Barmakers haven't the least idea how first and second quarter demands for their product are going to be accommodated. First quarter carryover is substantial, ranging from four to six weeks. Brunt falls on sizes over 1-in. diameter.

Plates . . .

Plate Prices, Page 547

Boston—Both leading New England shipyards will require more steel in 1953, having added to backlogs last month. Ships included will need at least 40,000 tons, mostly plates. Bath, Me. yard booked three large destroyers and two escort vessels. Bethlehem Quincy yard booked two large tankers. Volume of stainless steel in the Bath contracts will be heavy. While all signs point to an indefinite stringency in heavy and wide sheared plates, some fabricators are becoming skeptical, terming mill policy as "cozy" in scheduling. If they press hard enough they frequently get on books with at least part of needed tonnage, even for February, after being turned down for first quarter.

New York — A tight market for plates in second quarter is predicted by sellers, all of whom have now opened books for that period or for at least the first month. Some producers believe there will not be quite the stringency now being experienced or likely to be experienced throughout first quarter, but that supply, nevertheless, will still be short of demand. This is especially true of sheared and universal plate. Strip plate may not be tight at all; in fact, some strip plate only recently has been available for shipment in first quarter.

Philadelphia—Plate mills haven't opened books for the entire second quarter, preferring to move along on a monthly basis on the theory that they can keep a closer line on schedules. Producers generally anticipate good second quarter operations, although possibly not quite as active as in first quarter.

Pittsburgh—Plates will be in tight supply during second quarter. If current military orders are any indication even lighter gage plates will be tight.

Chicago—A better appraisal of the plate market situation will be afforded shortly now that producers have opened second quarter books and advised customers as to their quotas. Few consumers will be happy with adequacy of the tonnage offered. Prospects are plate fabricators must continue their hand-to-mouth existence indefinitely.

Sheets, Strip . . .

Sheet and Strip Prices, Page 547 & 548

Chicago—Expanded production of automobiles during first half of this year virtually assures a tight supply situation in sheets during this period. Since demand from all other fields likewise continues strong and shows signs of increasing, it is now certain that full output won't be equal to complete accommodation.

Boston—Limited openings in rolling schedules for first quarter carbon sheet orders have stimulated placement of April-June volume. Allotments are heavier and most consumers are ordering the additional tonnage authorized. This spurt in buying is only partly for better balance in inventories. Order books for fabricated end-products account for substantial procurement. Forward buying of narrow cold strip is less pronounced than for sheets.

Philadelphia—Prospects for hot and cold-rolled sheets continue promising. Most producers expect active operations throughout the entire first half of the year. Galvanized sheet production is being stepped up in the East, but not sufficiently to meet all consuming requirements.

Pittsburgh — Some ticket holders wanting sheets during second quarter may not be able to place their orders. Conversion inquiries for tonnage deliveries in second quarter are reported, but expanded production will probably keep these orders somewhat under figures for first quarter.

Cleveland — Relatively little open sheet tonnage will be available for civilian goods makers in second quarter. The overflow of tonnage from first quarter is expected to be heavy, though less than that from fourth quarter to first quarter.

Structural Shapes . . .

Structural Shape Prices, Page 547

New York—November shipments of fabricated structural steel amounted to 222,594 tons, a decline of 15 per cent from the preceding month, but slightly higher than in the like month of 1951, according to latest data compiled by the American Institute of Steel Construction.

Total shipments for the first 11 months of 1952 were 2,436,953 tons comparing with 2,499,583 in the corresponding period of the preceding year.

Bookings during November were 143,454 tons, a decrease of 22 per cent from the previous month. Bookings for the first 11 months totaled 2,267,381 tons, comparing with 2,728,237 in the like period of 1951.

The backlog of work ahead as of Nov. 30 stood at 2,357,351 tons. This compares with 2,437,668 on the same date in 1951 and with the 1947-1950 average of 1,407,149 tons. The Institute reports 44 per cent of the work is scheduled for production in the 4 month period ending Mar. 31. In the following four months 56 per cent is scheduled for production.

Boston—Fabricated structural steel contracts, 100 tons or more, approximated 81,263 tons in New Eng-

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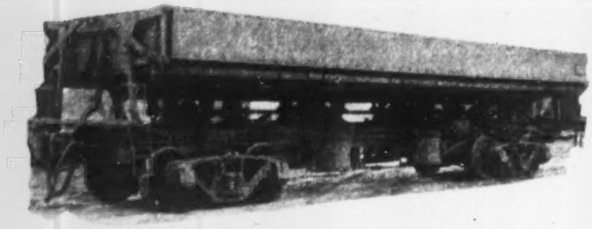

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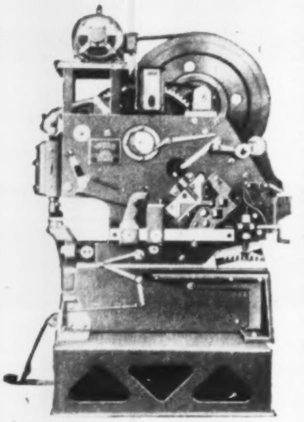

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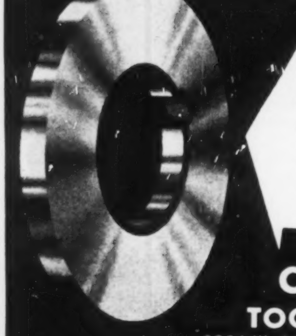

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land during 1952, compared with 76,937 tons in 1951. Better than 25,000 tons for the Fitzgerald Expressway, Boston, account for the increase. Including contracts for less than 100 tons, and tonnage moved from warehouse, close to 135,000 tons of structural steel were put into place last year.

Philadelphia While structural activity momentarily is light, fabricators anticipate receipt of considerable new work, primarily public in nature, for fabrication in second quarter. Meanwhile, they have enough business on order to assure active operations through the early months of this year.

Pittsburgh Second quarter books are open, but it is too early for mills to predict status of ticket orders. Meanwhile structural fabricators press for more steel, particularly wide flange beams. Carbuilders are not operating at top capacity.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 547

Seattle Northwest Steel Rolling Mills Inc. has closed its rolling mill for annual overhaul. It will be down for about two weeks. Furnace operations are off 10 per cent under power conservation regulations. Other plants in the area also are saving power. Considerable reinforcing tonnage awaits placement. First quarter prospects indicate capacity production depending on amount of power available.

Warehouse . . .

Warehouse Prices, Page 553

Boston While warehouses got 20 per cent of the finished steel shipped by the mills last year they took in approximately 1.4 million tons less than in 1951. This year they expect to get larger tonnage but their take percentagewise may slip. With the increase in receipts, supply gradually getting into balance, most normal mill buyers will be lost. However, a substantial crop of legitimate warehouse buyers has sprung up from small, light metalworking industries, and a satisfactory first half year is in sight.

Pittsburgh — Warehouses expect strong business during first half of 1953. Their current problem is still one of stock balance. Large diameter bars and sheets are in big demand but poor supply. Tin mill products are seeking buyers.

Cleveland Ordering fell off over the holidays but local warehouses report December volume about equaled that of November. In some cases volume would have been larger were stocks available to satisfy all current demands. Distributors' inventories are still badly unbalanced though over-all stocks have been gaining for some time past. Stocks now are estimated to average about 50 per cent of pre-Korean volume.

Chicago Warehouses experienced no diminution in demand at the turn of the year. Requirements of consumers hold strong with products in shortest supply in greatest need. Inventory improvement in heavy bars, plates and sheets is simply out of the question under present conditions. Mill receipts hold steady.

San Francisco Industrial steel warehouses ended 1952 with better inventories than they held at the beginning of the year. But stocks were highly unbalanced. In recent weeks distributors have been getting some extra tonnage, but there is great scarcity of some items.

Ship More Finished Steel

New York Shipments of finished steel in October, totaling 7,155,611 net tons, were higher than ever before, according to the American Iron & Steel Institute. The total was 614,000 tons more than was shipped in September and 312,000 more than in October, 1951.

Stainless steel shipments, while constituting a small portion of the total, were considerably higher than ever before at 57,232 tons. Shipments of other alloy steels closely approached record proportions at 561,593 tons. While rising trends were shown in most steel products, recent increases were pronounced in galvanized and cold-rolled sheets.

Shipments of 51,244,615 net tons of steel in 10 months were 11.7 million tons less than in 1951, reflecting the midyear strike loss.

Practically all industries shared in the increase in October shipments over September, some of the largest tonnage increases being for makers of automobiles, railroad and industrial equipment. For the 10 months, however, all industries shared in the general reduction in shipments with the exception of shipbuilding, exports and such military goods as guns and tanks.

Direct shipments for military use, except ships, planes, autos and certain noncombat items, were 228,183 tons in October, a new monthly high and 3.2 per cent of total shipments.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 551

Washington Coke oven capacity constructed in 1952 was the largest ever placed in operation in a single year with the exception of 1943. Completion of about 900 ovens with capacity of 5 million tons was reported for the year.

Construction now is under way on 18 additional projects involving 1300 coke ovens with a capacity of about 7 million tons. Most of these will be completed this year. Work also is expected to start this year on 9 new projects involving 600 ovens with capacity of about 3 million tons.

The coke oven construction program undertaken after the outbreak of the Korean war is the largest in the history of the industry. During the 1951 through 1953 period, new coke ovens will be built with a total capacity of more than 16 million tons. However, dismantling of overage ovens will result in loss of about 9 million tons so that the net gain will run about 7 million.

On Dec. 5, 1951, the Defense Production Administration established an expansion goal calling for the increase in capacity of slot-type ovens to 84 million net tons by Jan. 1, 1954. This constituted an increase of about 11,500,000 over the 1950 level. It is anticipated, however, that coal chemical oven capacity will fall about 1,500,000 tons short of the expansion goal on the target date.

Coke demands are now being met from current production and from the supply stockpiled by the steel companies during the strike. With the entry of five new blast furnaces into production in the spring of 1953, nevertheless, the supply of oven coke may fall behind demand.

Pig Iron . . .

Pig Iron Prices, Page 546

New York Blast furnace production declined slightly in November, reflecting the shorter month. Data compiled by the American Iron & Steel Institute show total production of pig iron, ferromanganese and spiegel during the month was 6,227,288 net tons, comparing with 6,515,091 in October and 5,911,373 in November, 1951.

Of total November output, 6,155,565 tons were pig iron and 71,723 ferromanganese and spiegeleisen.

Furnace operations in the month averaged 102.9 per cent of capacity, comparing with 101.2 per cent in October.

For the 11 months ended November total output of the nation's blast furnaces was 55,649,055 net tons, comparing with 65,255,441 in the like period of 1951.

	Pig Iron (net tons)	Ferromanganese and Spiegel (net tons)	Total Blast Furnace Output (net tons)
1952			
October	6,442,024	73,067	6,515,091
November	6,155,565	71,723	6,227,288
11 Mos.	55,092,529	556,526	55,649,055
1951			
October	6,132,051	65,125	6,197,176
November	5,843,020	68,353	5,911,373
11 Mos.	64,574,833	680,608	65,255,441

New York Another week or two may be required to get the movement of pig iron back to the preholiday level. Many sellers do not anticipate the movement will exceed that level for a while, however, unless lifting of the 30-day inventory limitation by the government, which some expect to be announced anytime, gives trading a special boost.

Boston Foundry melt went off slightly over the holidays, but pig iron shipments to consumers will be somewhat heavier this month, notably from outside furnaces. Part of this increase will be due to curtailed shipments from the Everett stack because of more unbalanced stocks. On the whole, however, Everett furnace will cover substantially regular contract customers without too much trouble. Slight upturn in shop melt is apparent with jobbing foundries.

Philadelphia Pig iron sellers see no great spurt in demand for foundry grades ahead. They do look for a slight upturn in foundry requirements following the holiday curtailments, but no real improvement over preholiday foundry operations is expected for at least several weeks.

Cleveland Resumption of foundry operations following the holiday cur-

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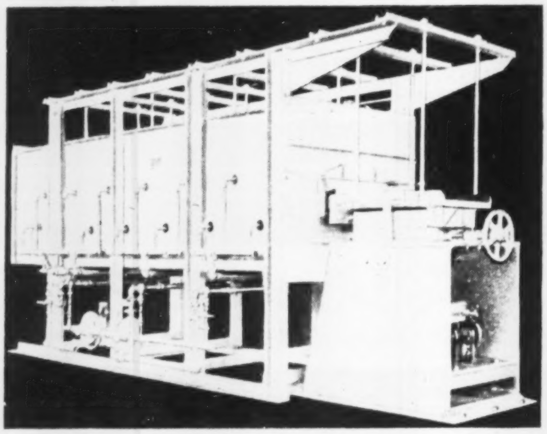

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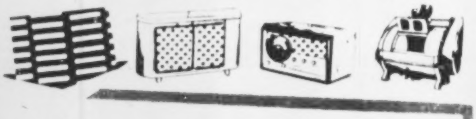

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tailments is expected to stimulate demand for merchant pig iron. Some of the jobbing shops that have not been fully occupied in recent past months anticipate a pickup in demand for castings with appliance manufacturing gaining.

Blast furnace operations in this immediate district were returned to 100 per cent when Republic Steel Corp. on Dec. 26 blew in its one idle stack that had been down for relining since late in October.

Chicago—Jobbing foundries are encouraged by the strong demand being maintained for steel products for it carries implications of a pickup in castings orders. Melting operations continue spotty but now first quarter is expected to work out better than originally predicted. Pig iron supply currently matches needs and unless castings output expands sharply no metallics supply problems are anticipated.

Scrap . . .

Scrap Prices, Page 554

Cleveland—High-level steelmaking operations assure steady demand for scrap through first quarter though pressure on the market is not likely to be extremely strong since mill stocks are at highest level in years. However, the mills are taking in good-grade material steadily, thus maintaining inventories at comfortable levels. Active fabricating operations are reflected in a substantial flow of prompt industrial scrap to the market.

Detroit—Weakness in cast scrap has become pronounced, traders reporting no material being currently sought. How much of the demand sag can be attributed to holiday and yearend inactivity cannot be appraised, but renewed buying is expected to be at lower price levels.

Chicago—Each succeeding week gives more assurance of maximum winter steel production without scrap shortage. Unusually open weather combined with a scrap cushion accumulated during last summer's steel strike are responsible for the present affluence. Intake of steel mills closely matches consumption, leaving inventory secure.

Philadelphia—Most steel mills enter the new year with fairly good scrap inventories. Hence, while they are interested in getting their share of scrap offered, they are not pressing for tonnage too hard and they are inclined to be selective in their purchases. Prices on steel grades continue at ceiling. Cast scrap is in easy supply, with certain materials notably No. 1 cupola cast and unstripped motor blocks quoted below ceiling.

Pittsburgh — Scrap dealers and buyers were inactive over end of the year. While not at a standstill, only isolated transactions were noted. Major grades of scrap continue at ceiling prices. Cupola cast scrap is weak. Scrap specialties are getting most attention.

Washington — Scrap consumption increased in September, according to the Bureau of Mines. This is the latest month for which data are available. Purchased scrap use in the month totaled 2,862,994 gross tons, an increase of 124,401 over August. Home scrap use amounted to 2,919,992 gross tons, increase of 187,889.

Stocks of purchased scrap held by consumers at the end of September totaling 5,051,442 gross tons, increased for the ninth consecutive month. Home scrap stocks amounted to 1,238,853 gross tons, increasing for the seventh consecutive month.

San Francisco—Scrap is in satisfactory supply. Mill and foundry inventories are comfortable and deliveries currently are equal to consumption. The outlook is far more encouraging than it was a year ago. Prices are not as firm as at the outset of 1952. No. 1 heavy melting steel is holding ceiling at $34, but No. 2 melting steel and No. 2 bundles are quoted $5 below ceiling at $29. Machine shop turnings cracked $11 a ton during the year closing 1952 at $14 a ton. No. 1 cupola cast at $44 went $5 below ceiling during the closing months of last year.

Seattle — Heavy melting scrap commands ceiling prices but bundles are available $5 under ceiling, and cast grades as much as $10 under.

Rails, Cars . . .

Track Material Prices, Page 549

Washington — Steel shortages in 1952 retarded the railroads' freight car building program, according to William T. Faricy, president, Association of American Railroads. While the roads requested steel allocations for at least 10,000 new cars monthly, production of cars reached a low of 3762 in September. Some 65,000 new cars were placed in service during the year, but because of the retirement of old cars at the rate of about 5000 monthly, the net gain was slight.

Pushing their pledge to increase freight car ownership of Class 1 roads to 1,850,000, at the beginning of 1953 the net increase still needs more than 90,000 units to reach the goal. As it will be necessary to replace about 120,000 cars to be retired, the program will require construction of some 210,000 new cars.

New York—Class 1 railroads placed 2244 new locomotives, consisting of 2865 power units, in service in the first 11 months of 1952. In the same period of 1951, they installed 2366 consisting of 3221 power units. Of the total number installed 2220 were diesel and consisted of 2840 power units. The remaining locomotives included 17 steam, one twin-unit electric and 6 gas-turbine electric.

The Class 1 roads had 794 locomotives on order Dec. 1, 1952. These included 748 diesel made up of 865 units, and the balance consisted of 19 gas turbine, 17 steam and 10 electric. On Dec. 1, 1951, the roads had 1908 locomotives on order, including 1778 diesels.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1010 tons, expansion of Everett, Wash., pulp plant, to Bethlehem Pacific Coast Steel Corp., Seattle, by Scott Paper Co., Boston, Mass.

520 tons, expansion of Hanford, Wash., Works to Bethlehem Pacific Coast Steel Corp.

STRUCTURAL STEEL PENDING

250 tons, including plates and pipe, completion Canyon Ferry power project, Montana; Eisenman, Seabrook & Elliott, Chula Vista, Calif., low to Bureau of Reclamation, Denver.

233 tons, state highway bridge, Camden county, N. J., bids Jan. 20.

150 tons, rehabilitation Savage Rapids dam, Oregon; bids to Bureau of Reclamation, Bend, Oreg., Jan. 20.

110 tons, also 26 tons reinforcing, maintenance shop and hangar, McChord Field, Wash.; bids to U. S. Engineer, Seattle, Jan. 12 and Jan. 16, respectively.

Unstated, steel frame hot cell building; bids to Atomic Energy Commission, Idaho Falls, Idaho, Jan. 21.

Unstated, 7½ ton gantry crane for Lookout Point penstock, completion June 1, 1954; bids to U. S. Engineer, Portland, Oreg., Jan. 27.

REINFORCING BARS . . .

REINFORCING BARS PLACED

100 tons, including 60 tons Washington road project, to Northwest Steel Rolling Mills Inc., Seattle; N. Fiorito Co., Seattle, general contractor.

REINFORCING BARS PENDING

100 tons, Washington state Fox Island bridge; Manson Construction & Engineering Co., Seattle, low $1,051,476.

200 tons, Washington state highway projects; general contracts awarded.

165 tons, two dormitories, Ladd Air Field, Alaska; Baker & Ford, Billingham, Wash., low $1,136,196 to U. S. Engineer.

160 tons, also 25 tons steel pipe, 8-mile concrete lined power canal, Columbia Basin project; J. A. Terteling & Sons, Boise, Idaho, low to Reclamation Bureau, Denver.

Unstated, warehouse and office addition, Willbridge terminal, Portland, Oreg.; bids to Standard Oil Co. of California, San Francisco, Dec. 30.

Unstated, ammunition igloos and storage, Yakima, Wash., training station; F. R. McAbee Inc., Seattle, low $234,693, to U. S. Engineer.

Unstated, two maintenance shop buildings, Fort Richardson base, Alaska; bids to U. S. Engineer, Anchorage, Alaska, Jan. 16.

Unstated, auto maintenance facilities building, Eielson Air Field, Alaska; first bids returned unopened; second call Dec. 29 to U. S. Engineer, Anchorage, Alaska.

Unstated, factory plant for General Tractor Co.; bids to Columbia Basin Agency, Ephrata, Wash., Jan. 7.

PLATES . . .

PLATES PENDING

Unstated, 2250 linear feet of sheet steel piling, 16 inch diameter by ⅜ inch, also 300 feet corner piling, 8½ x ⅜ inch; bids to General Supply Agency, Seattle, Dec. 29.

PIPE . . .

CAST IRON PIPE PLACED

600 tons, various sizes for stock, to Pacific States Cast Iron Pipe Co., Provo, Utah, by Portland, Oreg.

400 tons, various sizes for stock, to Pacific States Cast Iron Pipe Co., Provo, Utah, $82,801, by Spokane, Wash.

CAST IRON PIPE PENDING

175 tons, system extension, Seattle; Argentieri & Colorossi, Seattle, low, $57,601 and $58,061 respectively, two schedules.

RAILS, CARS . . .

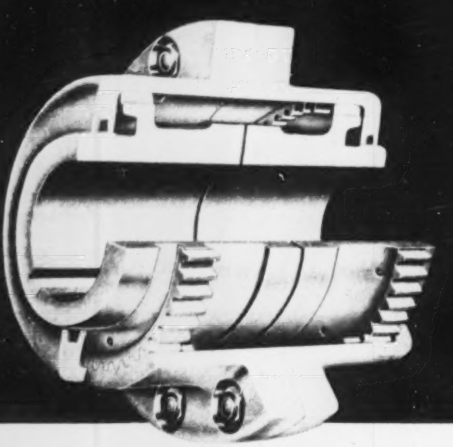
LOCOMOTIVES PLACED

New York, New Haven & Hartford, 10 electric locomotives, costing $4 million, to General Electric Co., Schenectady, N. Y. This purchase is part of a $30 million program over the next 12 months which will also include 100 multiple unit passenger cars, costing $15 million; 550 coal cars costing $3.8 million and 30 Budd rail diesel cars costing $4.8 million.

RAILROAD CARS PENDING

New York, New Haven & Hartford, 15 sleeping cars, bids asked; each car is estimated to cost around $200,000.

POOLE



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CONSTRUCTION—ENTERPRISE—ORGANIZATIONAL CHANGES

Will Rehabilitate Tungsten Mines

Utah Construction Co. is reported in San Francisco to have signed a contract to undertake rehabilitation of tungsten mines in Korea. Specifically named are the Sangdung and Dalsung mines, ranked among the world's best sources of high grade tungsten ore. The United States government has contracted to buy Korean tungsten in large quantities over a five year period. Construction of a tungsten refinery in Korea is planned.

Detroit Steel Products Expands

Erie Division, Detroit Steel Products Co., Erie, Pa., is tooling up and making physical expansions to complete a $2.7 million antitank mine order for the armed forces.

Engineering Firm Changes Name

Wheeler-Brady Inc., Cleveland, consulting engineering firm, changed its name to Wheeler Associates Inc. Robert Brady, one of the original members of the firm, resigned.

Combustion Equipment Maker Expands

Bloom Engineering Co., Pittsburgh, designer and manufacturer of industrial gas and oil burners and auxiliary combustion equipment, completed a major plant expansion program. This project gives Bloom a substantial increase in production facilities, an improved test laboratory, more office space and a 100 per cent increase in assembly and storage area.

Steel Products Firm Gets Franchise

Stainless & Steel Products Co., St. Paul, has made arrangements for the exclusive manufacture and sale of the fermentor originally designed by Bristol Laboratories Inc., Syracuse, N. Y. E. W. Weiler, 724 Fifth Ave., New York, is the general sales manager.

Marwais Building Sheet Steel Plant

Marwais Steel Co., Los Angeles, is building a sheet steel plant in the Vail Field section of the Central Manufacturing district, that city. The new unit is scheduled to be in production by Apr. 1 with an estimated capacity of more than 5000 tons of sheets a month.

Phebco Equips Manufacturing Plant

Phebco Inc., Baltimore, equipped about 5000 square feet at 3640 Woodland Ave., Baltimore, for the designing and manufacturing of electronic equipment. The company was organized about six months ago and is just getting into production. John M. Pearce is president; Philip A. Hoffman, vice president.

Basco Mfg. Co. Organized

Basco Mfg. Co., 5 Woodside St., Stamford, Conn., was organized to manufacture sheet steel separators, formerly marketed by D. C. Canfield, New Britain, Conn. The separators are a magnetic unit that permits automatic separation of stacked sheet metal.

Configured Tube Opens Plant

Configured Tube Products Co. formally opened its $250,000 plant in Bellwood, Ill. It houses machinery for processing steel tubing used in the manufacture of furniture, gas ranges, and cream separators. The company also produces specialized tubing for airplane engine manufacturers.

To Distribute Bethlehem Tool Steels

Beals, McCarthy & Rogers Inc., Buffalo, was appointed a warehouse distributor for Bethlehem tool steels. Metallurgical assistance, including information on all properties and applications, is available from this organization as well as from the staff of Bethlehem Steel Co.

Elevator Companies Merge

Warsaw Elevator Co., Warsaw, N. Y., merged with Watson Elevator Co. Inc., New York. The Warsaw company will operate as the Watson Elevator Co. Inc., Warsaw Division. The consolidation, officials said, will greatly strengthen the Warsaw Division's financial structure.

Food Machinery Buys Mowamatic

Food Machinery & Chemical Corp., San Jose, Calif., purchased Mowamatic Corp., Mt. Vernon, N. Y., producer of power lawn mowers. The latter company will be operated as a subsidiary unit of the parent firm; sales headquarters are being transferred to Port Washington, Wis.

Rapids-Standard Moves Departments

Rapids-Standard Co. Inc., Grand Rapids, Mich., manufacturer of conveying equipment, moved two of its departments from 43 Grandville Ave. to new quarters in the same city. Sales & Advertising Division is now located in Rapistan Bldg., 144 Trowbridge St. NW; sales engineering department, in the plant at 507 Ply-

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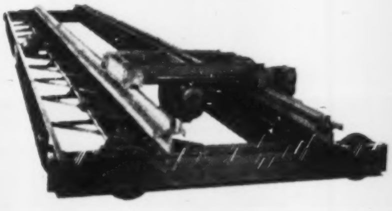

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mouth Rd. where power belt units are manufactured.

C. E. Rowe Forms Engineering Firm

Carl E. Rowe, who has been engaged in various phases of consulting engineering and in foundries in the Middle West for the past 17 years, established his own consulting engineering firm, Carl E. Rowe & Co., 125 E. Wells St., Milwaukee.

Noranda Mines To Build Plant

Noranda Mines and North American Cyanamid Ltd. concluded arrangements by which Noranda will construct a $4 million plant immediately adjacent to Cyanamid's plant in Welland, Ont. The plant will treat 350 tons of pyrite concentrate per day, using a new process which Noranda has had under development for several years.

Burlington Industries Pool Formed

Burlington Industries Pool, 109 Lafayette St., Riverside, N. J., is the 21st small business production pool to be organized during the current mobilization program. The pool's five small firms, located in the nearby New Jersey and Pennsylvania area, plan to seek defense contracts in the fields of machining, fabrication and assembly of metal and wood products. It is interested, in part, in defense work involving welding, stamping, forging, pattern work, machining, painting, plating, and research and development. The firms participating in the pool are: Burlington Industries Inc., Riverside; Alesco Metal Products, Hatboro, Pa.; Public Welding & Iron Service, Bristol, Pa.; Riverside Yacht Yard, Riverside; Russell H. Sheehan, General Machine Products, Riverside.

Weber Buys Choremaster Division

Lodge & Shipley Co., Cincinnati, sold the assets of its Choremaster Division to Weber Engineered Products Inc., that city. Lodge & Shipley's facilities will be devoted entirely to lathe developments and expanded research in the broader fields of metal turning with which the company has been identified for over 60 years.

Cleveland Broach Completes Plant

Cleveland Broach Co. Inc., affiliate of Cutter Salvage Corp., Cleveland, completed its plant at 1061 Lakeland Blvd., Euclid, O. The plant contains equipment for producing broaches of any size, shape, and type, broach inserts, bars and fixtures. The company also offers a complete broach altering and reconditioning service.

Solvent Producer Names Agents

John B. Moore Corp., Nutley, N. J., appointed as its representatives: Norman M. Gottfried, Pittsburgh; Caldwell Chemical Co. Inc., Detroit; and Arthur K. Meyer Co., Los Angeles. Warehouse stocks of the company's safety solvents were installed

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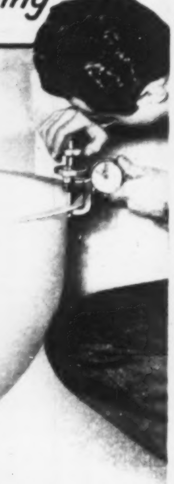

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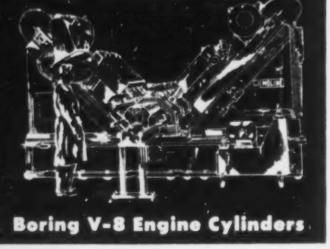

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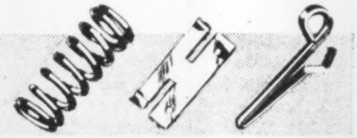

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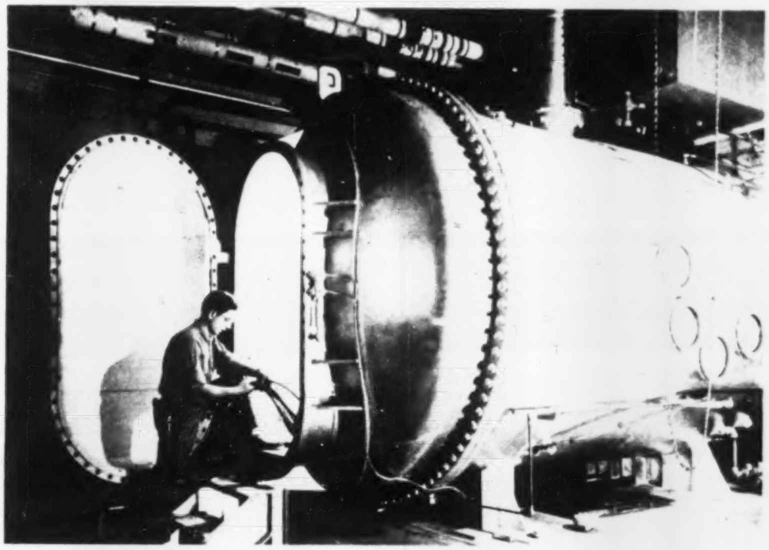

High Altitude Testing on Ground Level

Materials are ten miles high without leaving the ground in this turbo pump altitude test chamber at General Electric Co.'s aircraft testing facilities in Lynn, Mass. Here reheat fuel pumps for jet engines are tested at varied altitudes. With its volume of 950 cubic feet, the chamber can hold a 470-gallon fuel tank. Engineers may observe pump operation through windows in sides of the chamber

in Pittsburgh and Detroit. Production of the company's solvent products is at Clifton, N. J.

Stern Heads Can Makers Group

David Stern, treasurer and general manager, Stern Can Co. Inc., Boston, was elected president of the Can Manufacturers Institute, New York, succeeding Richard P. Swartz, consultant, American Can Co., New York.

KSM Products Opens District Office

KSM Products Inc., Merchantville, N. J., manufacturer of studs and equipment for electric-arc stud welding, opened a district engineering office in Milwaukee. Jack Harris, formerly of Cleveland, was appointed district engineer.

Robinson Buys Stowe-Fuller Assets

All property and assets of Stowe-Fuller Refractories Co., with plants located at Alexandria, Pa., and Strasburg, O., were purchased by Robinson Clay Products Co., Akron. Robinson expects to continue to operate Stowe-Fuller as in the past.

Cooper Gets Cutting Tool Franchise

Cooper Tool & Engineering Co., Minneapolis, was awarded the cutting tool franchise for that area by Standard Tool Co., Cleveland. Cooper Tool will handle the complete Standard line of cutting tools, including twist drills, reamers, counterbores, milling cutters, hobs and end mills.

Spring-Air Co. Changes Name

Spring-Air Co. changed its corporate name to Karr Spring Co. The firm is located at 12 W. Fourth St., Holland, Mich.

Damascus Tube Appoints Agent

Damascus Tube Co., Greenville, Pa., appointed E. R. Staley & Co., St. Louis and Kansas City, Mo., as its sales representatives in that territory.

Fairfield Engineering To Build

Fairfield Engineering Co. will build a factory on land adjacent to its present factory at 324 Barnhart St., Marion, O. Luria Engineering Co., Bethlehem, Pa., will start erection in February and will complete it in

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April. Fairfield is a manufacturer of conveying and mixing machinery and coal and ash handling equipment.

Calumet & Hecla To Move Offices

Corporate name of Calumet & Hecla Consolidated Copper Co., Boston, was changed to Calumet & Hecla Inc. The firm will establish executive offices in Chicago early next year. Endicott R. Lovell, president, and ten top executives will have offices in the new headquarters.

Interstate Engineering Builds Plant

Interstate Engineering Corp., Los Angeles, is constructing a plant at 707 E. Vermont, Anaheim, Calif., for manufacture of vacuum cleaners and defense items. Completion is scheduled by February.

Gibney-Coffman Gets More Accounts

Gibney-Coffman Corp., Buffalo, was appointed regional representative for Brad Foote Gear Works Inc., Cicero, Ill., and Superior Steel & Malleable Castings Co., Benton Harbor, Mich. Brad Foote makes speed reducers, transmissions, intricate power units and every type of gear. Superior is well known for the quality of its steel and malleable iron castings.

Wire Association Elects Officers

Officers of the Wire Association, Stamford, Conn., elected for 1953 are: President, L. C. Crewe Jr., president, Maryland Fine & Specialty Wire Co., Cockeysville, Md.; vice president, Tom Girdler Jr., assistant manager of operations, Union Drawn Steel Division, Republic Steel Corp., Massillon, O.; vice president, Ralph Roth, vice president, Ludlow-Saylor Wire Co., St. Louis. Richard E. Brown, publisher of *Wire and Wire Products*, Stamford, was re-elected executive secretary.

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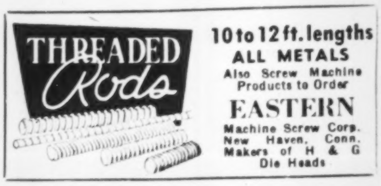
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3. 1/4″ Dia.	240 lbs
4. 5/16″ Dia.	1C5 lbs
5. 3/8″ Dia.	121 lbs
6. 1/2″ Dia.	142 lbs
7. 3/4″ Dia.	22 lbs
8. 13/16″ Dia.	12 lbs
9. 15/16″ Dia.	72 lbs
10. 1-1/16″ Dia.	88 lbs
11. 1-3/16″ Dia.	525 lbs
12. 1-1/4″ Dia.	283 lbs
13. 1-3/8″ Dia.	2761 lbs
14. 1-7/16″ Dia.	76 lbs
15. 1-9/16″ Dia.	1168 lbs
16. 2″ Dia.	440 lbs
17. 2-1/8″ Dia.	73 lbs
18. 2-1/4″ Dia.	164 lbs
19. 2-7/16″ Dia.	1663 lbs
20. 2-1/2″ Dia.	5669 lbs
21. 2-3/4″ Dia.	126 lbs

HOT ROLLED FLATS

1. 3/8″x1-1/8″	48 lbs
2. 3/8″x6″	111 lbs
3. 1/2″x6″	116 lbs
4. 1/2″x1-1/2″	90 lbs
5. 1/2″x1″	666 lbs
6. 1/2″x5″	645 lbs
7. 1/2″x1-1/4″	310 lbs
8. 5/8″x4″	134 lbs
9. 5/8″x5″	169 lbs
10. 3/4″x1-1/4″	146 lbs
11. 3/4″x2″	1105 lbs
12. 3/4″x2-1/4″	481 lbs
13. 3/4″x2-3/4″	1031 lbs
14. 3/4″x1″	105 lbs
15. 3/4″x2-1/2″	597 lbs
16. 1″x2″	241 lbs
17. 2-1/4″x2-1/2″	255 lbs
18. 2-1/4″x2-3/4″	343 lbs
19. 2-1/4″x4″	160 lbs
20. 2-1/2″x4-1/16″	578 lbs

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1. 5/8″x5/8″	203 lbs
2. 7/8″ x 7/8″	415 lbs
3. 1-1/8″ x 1-1/8″	450 lbs
4. 1-1/4″ x 1-1/4″	58 lbs
5. 1-3/8″ x 1-3/8″	71 lbs
6. 1-3/4″ x 1-3/4″	60 lbs
7. 2″ x 2″	240 lbs
8. 2-1/4″ x 2-1/4″	277 lbs
9. 2-1/2″ x 2-1/2″	172 lbs
10. 3″ x 3″	394 lbs
11. 3-9/16″ x 3-9/16″	191 lbs

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1. 5/8″	25 lbs
2. 7/8″	30 lbs
3. 1-1/2″	810 lbs
4. 1-5/8″	129 lbs
5. 1-3/4″	46 lbs
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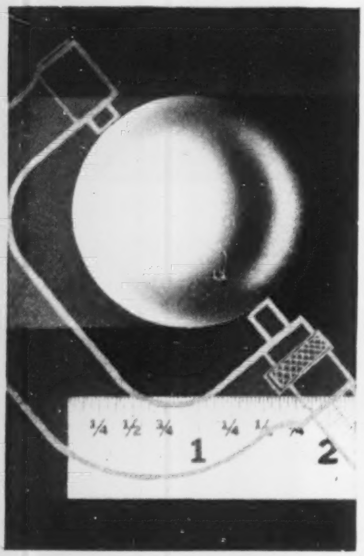

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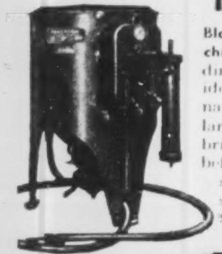

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Unit Dust Collector stops dust at source, minimizes machine wear and tear, reduces housekeeping and maintenance costs. Solves many grinding and polishing nuisances. Models from $286.00 and up.

PRECISION FINISHING!

Hydro-Finish Cabinet uses liquid blast to polish, clean and finish molds, dies, etc. Removes scale, discoloration with minimum hand work. Holds tolerances to .0001". Models from $1410.00 and up.

Write for details on these machines to: Pangborn Corp., 1600 Pangborn Blvd., Hagerstown, Md.

Pangborn

Look to Pangborn for the latest developments in Blast Cleaning and Dust Control Equipment

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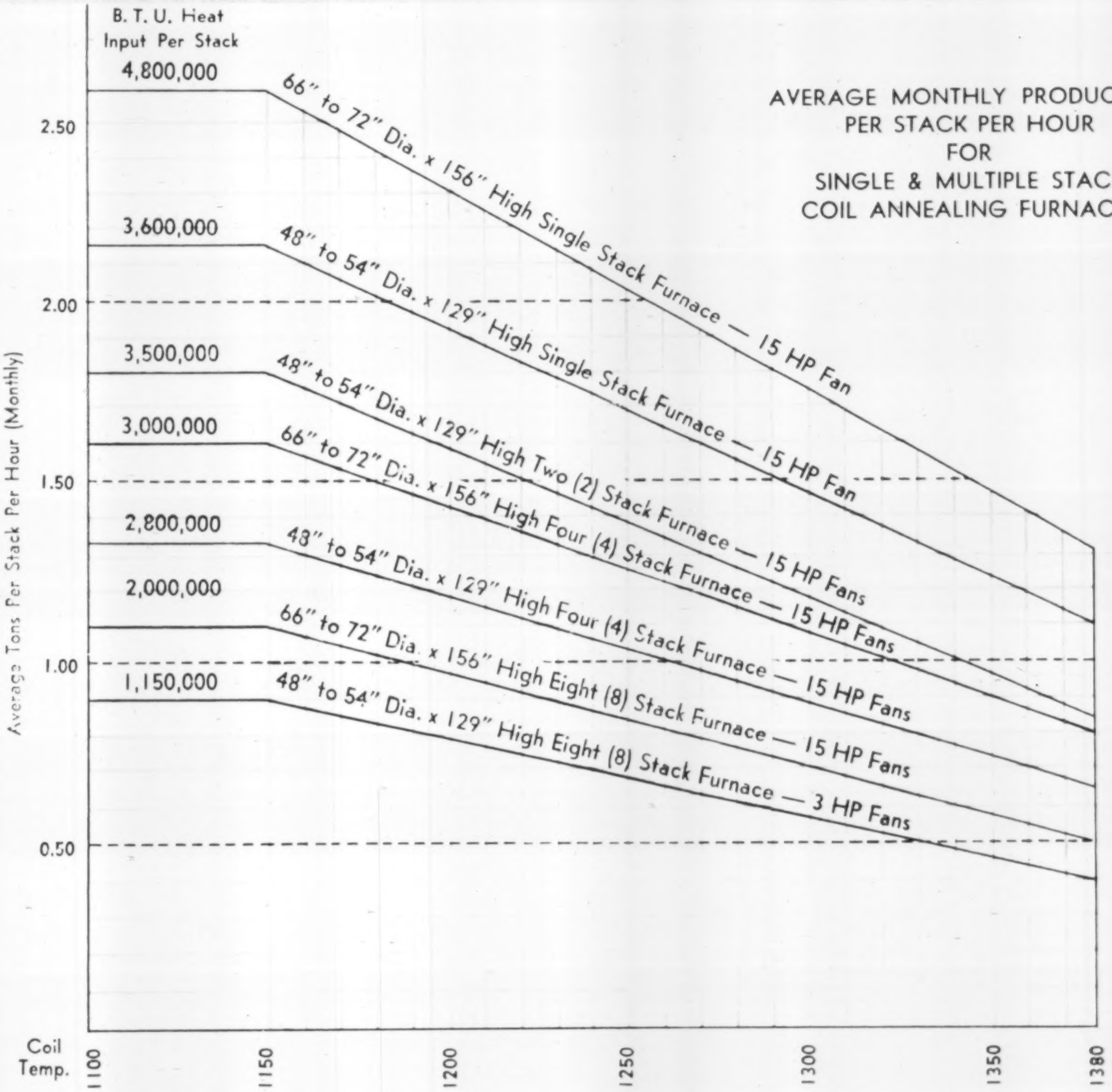
Lee Wilson

ANNEALING FURNACE DATA SHEET

NUMBER EIGHT

REVOLUTIONARY
PORTABLE BASE
SINGLE-STACK
ANNEALING SYSTEM

NEW ANNEALING SYSTEM OUTPRODUCES ALL EXISTING METHODS



The load factor for a single-stack furnace is about 90%, compared with 70% for 4-stack and 60% for 8-stack furnaces. This fact enables the single-stack to produce 50% more tonnage than an 8-stack unit due to load factor alone. Add to this the fact that it is possible to apply twice as much radiation about the bottom of a single-stack furnace and simple arithmetic tells us that this adds an additional 50% production—or a total tonnage increase of 100% over an 8-stand furnace.

Lee Wilson engineers, constantly checking production in the field, find that on an average (using monthly production figures) a multiple-stack furnace will produce about a ton per stand per furnace hour while single-stack units produce about two tons per stand per furnace hour.

This production increase, plus the many advantages of the new portable base, should be of great interest to everyone connected with sheet, strip and tin plate coil annealing. For further information, write Lee Wilson for fully explanatory brochure.

Lee Wilson
ENGINEERING COMPANY, INC.
CLEVELAND, OHIO

TIMKEN® work roll bearings on plate mill go 16 years without replacement!

THE same Timken® bearings are still going strong—*after 16 years' operation*— on the work rolls of a United 36" x 54" x 120" reversing mill in regular service in an Eastern plant of a large steel producer. In all that time, not a single bearing replacement has been made on the work rolls.

The mill's back-up rolls, screw down, and mill main drive are also mounted on Timken tapered roller bearings. With Timken bearings, long, trouble-free service is assured. Time-outs for maintenance and repair are held to a minimum.

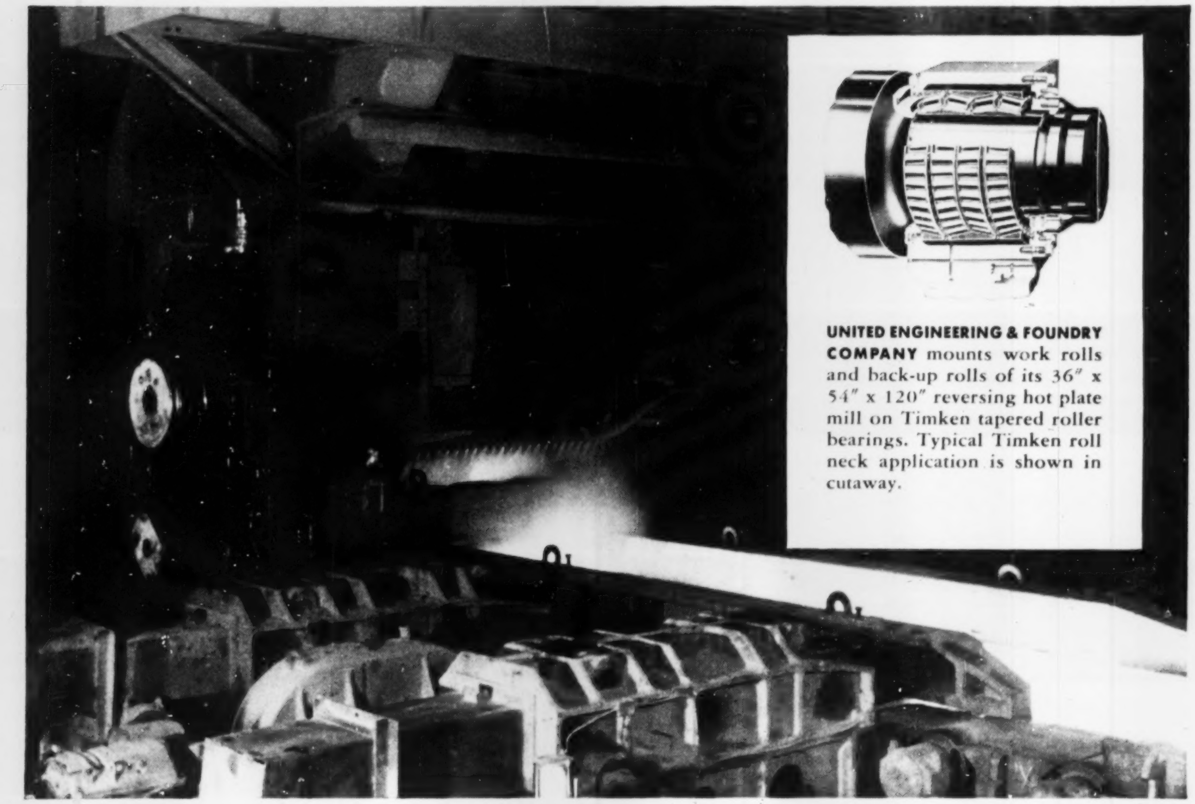
Timken bearings on work rolls and back-up rolls eliminate costly and complicated lubrication systems. Rolls can be quickly and easily changed. Simple, economical grease lubrication is used.

Since Timken bearings take both radial and thrust loads in any combination, special thrust bearings are not needed. Chuck mountings are simpler, more compact. Weight is minimized.

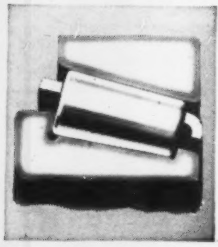
Because of their true rolling motion and incredibly smooth surface finish, Timken bearings have a lower starting resistance. Mills can accelerate more rapidly.

Years of Timken bearing research and development have resulted in many improvements in roll neck bearing design and performance. Write The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



UNITED ENGINEERING & FOUNDRY COMPANY mounts work rolls and back-up rolls of its 36" x 54" x 120" reversing hot plate mill on Timken tapered roller bearings. Typical Timken roll neck application is shown in cutaway.



GREATER LOAD AREA

Because the load is carried on the *line* of contact between rollers and races, Timken bearings carry greater loads, hold shafts in line, wear longer. The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

TIMKEN

TAPERED ROLLER BEARINGS